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ESSAYS, ABSTRACTS and REVIEWS

No. 1.

THE SURGICAL REMOVAL OF THE TARSAI CARILAGE
AND PALPEBRAL CONJUNCTIVA IN 402 CASES
FOR THE PROPHYLAXIS, PRESENT AND
FUTURE ELIMINATION AND ERAD-
ICATION OF TRACHOMA.

(Illustrated.)

I am writing this article after having had a personal experience of over one hundred thousand (100,000) cases of Trachoma among the Indians of the United States, and among many thousands of the white, and about three hundred (300) cases in the colored population of this country. We have performed this operation, *The Surgical Removal of the Tarsal Cartilage and Palpebral Conjunctiva* in four hundred two (402) cases.

It has been my good fortune as United States Government Eye and Trachoma Expert at Large, to find and to begin to investi-

gate and treat this disease in patients from practically every State in the Union. (Reference—A Brochure on Trachoma, by Dr. Daniel W. White, *Ophthalmic Record*, May, 1912.)

Our present and permanent location is Oklahoma, bounded by the trachomatous populating states of Texas, Arkansas, Kansas and Missouri. In Oklahoma alone there are at least eighty thousand (80,000) cases of trachoma amongst the Indians. (1912 Government Reports of Daniel W. White.) (Guthrie, of the United States Public Health Service, Senate Document No. 1038, 62nd Congress, 3d Session, Jan. 21th, 1913.) Guthrie estimates 68.2 % of trachoma, after a limited investigation of Oklahoma government schools and reservations, which were easily of access by train or by wagon.

We found a large per cent. of the whites of Oklahoma afflicted with this disease, but we are not prepared to state how many thousands of the whites have trachoma, as we have not compiled our reports in this relation.

The trachomatous population on the Arkansas boundary is appalling. Whole families are practically blind from this disease. Young married women of eighteen years of age have lost their vision. This condition is increased in its dreaded aspects in the wooded part of Arkansas. Texas, Missouri, Kansas and Illinois are affected in their order respectively. It is very prevalent in the states west of Oklahoma, and decreases when California is reached. The Northwest and North have their share of the disease. The true South is just beginning to wake up to the fact that trachoma is menacing them. While the far East, such as New York and Pennsylvania have been fighting their small per cent of trachoma for years. I can recall vividly of Dr. Howard Hansell, Professor of Ophthalmology at Jefferson Medical College of Philadelphia, showing our class a case of advanced trachoma while I was a student at Jefferson. This case was held as a hospital clinic case for a few days, so as to show him in the clinic. In New York City it was my experience to have seen a few of those advanced cases at Ellis Island and the eye hospitals there during my interne service. I speak of this only to impress on my readers that trachoma is an indefinite quantity in the far East, both in regard to its prevalence and severity. The far Southwest with its true trachoma would be of a shocking nature to our Eastern fraternity. To make this statement more positive, I would use the words "seeing is convincing." This, no doubt, is in part, due to the lax laws of the West, and their enforcement. In Oklahoma, trachoma is not a

quarantinable disease. Let us forget its prevalence and severity for a moment and note amongst other reasons why trachoma should be controlled by a known measure of elimination.

In Phoenix, Arizona, at the United States Government Trachoma and Eye Hospital, under the supervision of Dr. Ansil Martin and his assistant, Dr. William Simpson, Oculist, Dr. Martin and the writer, after reviewing records of cases under treatment with drugs, found that cases which were discharged as being apparently cured, later had to be retreated within six months to a year's time. In many cases of the Government employees' children, where operations (Expression) were refused, and treatment continued with drugs, the cases appeared worse after cessation of treatment for six months or longer. This was especially true of argyrol. This was also true of some light cases which were expressed by roller forceps, or some other similar measure. No light case was discharged as cured until six months of astringent massage and friction treatment after the operation of expression. It was possible at a school of this type, of 800 or more students from all sections of the United States, and a big Indian reservation to draw from, to base true and reliable reports. The enrollment of students was from two to ten years, and from the ages of three to twenty-one years. My statistics have been gathered from such reliable sources all over this country, both in the very young, middle-aged and aged. Dr. Martin has been in Arizona more than twenty years, and his experience in trachoma is noteworthy.

In my work at the Carlisle Indian School of Pennsylvania, the largest in the Government Service in attendance, I can state the same thing as to drugs and other methods used. L. Webster Fox, of Philadelphia, has performed gallant service to the Indians at this school. He has treated them for years in Philadelphia, and I firmly believe he has helped to stop the spread of this disease by his methods of treatment. The school has an outing system in which the Indian boys and girls work, during certain parts of the year in families in states near Carlisle. After my inspection of the school, it was agreed by the authorities and Dr. Allen, the doctor in charge, to send only non-trachomatous students into families. This would avoid the danger of conveying the disease.

In concluding this article, we give a personal history of forty cases. Each case is explanatory and is worthy of study.

Inasmuch as we have found that the treatment of advanced cases of trachoma under the use of drugs to be practically futile, the method in our experience of contending with this insidious

and disastrous disease is: *The removal of the tarsal cartilage and the palpebral conjunctiva.*

It has been the experience of every oculist with a large trachomatous practice to treat cases for years with slight improvement, and then a customary reaction; again an improvement; when finally the reaction has returned once too often and with disastrous results to the vision of the patient. Is it not an eyesore to the oculists to see those cases returning day after day when they are not prepared to say when one of these looked-for reactions will be fatal to the vision? The patient's health and livelihood and time only are being controlled by this temporizing measure. The disease still exists in the eyelid, and other tissues, otherwise reactions would not be so common.

Trachoma is a detriment to the patient, as it ruins his chance of success in life and makes him the common carrier of the disease to those with whom he is in contact. Innocent ones suffer unsuspectingly. He is being treated by drugs and other measures and at sometime he is apparently cured, to himself and to his doctor; yet after a year, more or less, the disease returns, and in time and gradually his vision becomes impaired without any subjective symptoms. (United States Government Reports of Daniel W. White of the *Futility of Drugs in the Elimination and Cure of Trachoma.*) I have seen this condition occur time after time. Then again, treatment is carried on during all his life with astringent drugs that give him so much discomfort though with all the uncertainty of reaching the deep pathologic tissue. *There is no recurrence or reinfection after the pathologic tissue is removed.* The patient's health, weight and spirits after the removal of the trachomatous tissue is, in many cases, amazing. Drug treatment very often results in a gradual relief from irritation and a slow and insidious loss of vision. With treatment, however, the vision is not impaired as soon as it would be without recourse to drugs; and I believe the cornea, after many years, is devitalized by the treatment, so the good results are lost to a great extent when we remove the pathologic tissue.

The histology and pathology of trachoma inform us of the utter impossibility of treating advanced cases to a successful issue with drugs.—Fuchs' *Text Book Ophthalmology*, Pages 163-169.

Drugs, or the milder surgical measures cannot to any degree reach the deep-seated trachoma. Drugs cannot correct Entropion or Ectropion, Canthosis or Ptosis, or the many symptoms and sequelae of advanced cases of Trachoma. Trachoma is so insidious

to the patient and doctor that it can go on for years without detection. If the disease were controlled, our public schools, public institutions and our public blind schools would be cleansed of this treacherous disease. In the beginning, patients (and sometimes doctors, we are sorry to relate,) do not consider the disease of a serious nature, and then these patients do not remain with the doctor for the long treatment which is necessary. The poor cannot afford treatment in their localities unless the doctor is charitable enough to help them. These unfortunates suffer when the disease is advanced. They become a prey for quacks, and finally they lose confidence in all doctors. We could write at length and give many more reasons for the adoption of the measure I propose, but I trust these few reasons will tend to make you realize the futile attempt to control this disease with the means now in general use.

PROPHYLAXIS.

1. All sanitary and hygienic measures regarded and strictly enforced. (See Text Books on Ophthalmology and Brochure on Trachoma by Author, May, 1912, *Ophthalmic Record*.)

2. Diagnosing the disease.

3. State and Federal Public Health Quarantine. Unlimited authority given to the Commissioner of State Department of Health.

4. Proper surgical and medical treatment for incipient cases of trachoma, and proper length of time for observation as a cure.

5. The removal of the tarsus and palpebral conjunctiva in stages of the earliest appearance of cicatricial tissue, as proposed by the authors.

6. The removal of the tarsus and palpebral conjunctiva and other diseased trachomatous issue in advanced cases of trachoma, whether the cornea is involved or not, as proposed by the authors.

From my Government reports I can give the history of whole tribes of Indians where the vision of the younger generation could have been saved. The author quotes one paragraph from a previous article by himself as follows: "The Pawnee tribe of Indians in Oklahoma present pannus in over 90% of cases over 40 years of age; and over 35% present double cataract, while at the present time their children, from 5 to 15 years of age, present the cicatricial stage of trachoma. We are prone to believe if they are not treated, pannus will result in the majority of cases when they reach their parents' age. This is also true of the Pueblos of Arizona and New Mexico. Shall we operate and remove the tarsus and conjunctiva in these cases? Is it justifiable to look forward to what has hap-

pened to their people, and what may happen to them? This is a question of deep study."—White.

I may add at this writing that my prophecy has happened to many of those poor Indians.

It is proposed by the authors that the following measure be taken to check the spread of trachoma:

1. Removal of conjunctiva and tarsus of a class of patients such as criminals in jails, reformatories, and the inmates of public institutions, such as blind schools and other state controlled institutions; and in cases where the patient will not treat himself, or is not able to treat himself, and is not able to come into civilized or proper centers to have his eyes treated. This removal in all doubtful cases of chronic conjunctivitis, and in the so-called follicular conjunctivitis and in certain cases of vernal catarrh.—(History Cases Nos. 11, 18, 27.)

2. Establishment of hospitals and schools by the State and private individuals for the instruction and treatment of trachoma.

(a) For example: The United States Government has appropriated money for construction of a Tuberculosis and Trachoma hospital for the Indians in Oklahoma. Much credit is due to Dr. Joseph Murphy, medical supervisor of the United States Indian Service, and Hon. Dana Kelsey, of the United States Indian Office of Oklahoma, for procuring this needed relief; and also, it is not amiss at this point to state that Charles Page, oil operator and philanthropist, and founder and maintainer of the Charles Page Orphan's Home, is building an Eye and Trachoma Hospital at Sand Springs, Okla., for this work. The Hospital will be semi-charitable to those unfortunates who are unable to pay for their board or treatment. The state and government could do the same with effect.

3. *Special course of training in medical schools on trachoma.*

4. Publicity of trachoma: lectures in public schools and other public gatherings. Discussion before medical societies, local and state.

DRUGS.

The authors intend to mention only the drugs he continues to use after his experiences have taught him their efficiency in his hands.

Copper sulphate has stood pre-eminent in drug treatment of the disease by the authors in their experience. It has given him better results than any other one drug. This drug, I am sorry to say, has been indiscriminately used, and some chemical cicatriciation of

tissue produced. It has been misused like salvarsan. The effect of copper sulphate is no doubt due to the polymorphonuclear leukocytosis attacking the disease, not only in the follicle but also in the infiltration.

The next drugs in order of efficiency are silver nitrate, bichloride of mercury, yellow oxide, tannic acid, boric acid, iodine, iodoform, thiosinamine, dionin, brown ungt. (Casey A. Wood), while argyrol in the author's hands has not been effective. Friction massage of the eyelids with boric acid, calomel, iodoform or bichloride of mercury solution, has been of good service to the author.

The author has used diphtheria antitoxin in 50 cases, but has not been able to procure a full report on this treatment at this time. The lactic acid bacillary tablet (powder) has not helped conditions in cases in which the author has given it a fair trial. He has not reached conclusions on autogeneous work he has under way. Electricity with chemical electrolysis has not been favorable to the authors. We have had no experience with radium.

Drugs do not attack the deeper pathologic tissues to any extent. Numerous surgical measures have been instituted for Trachoma. The expression operation has been the most popular and has been of inestimable service. The instruments in use are the Knapps roller forceps, the Prince, Noyes, Kuhnt and a few others. The Knapp is a very popular instrument. Trachoma rasps are also used, as well as grattage with a tooth brush (Dr. Frank Allport). The thumb nail has been used by some operators.

The authors are partial to the Expression operation in certain degrees of trachoma, but as a general lesser surgical measure than the removal of the tarsus. In all stages of trachoma they are in full accord with the sandpaper method. In their 2,200 operations or more by this method the discomfort to the patient was less than by other surgical measures. Coover, of Colorado, has had success with sandpaper. The author is placing on the market a silica rasp (See article May, 1912, *Ophthalmic Record*.) The authors have had better results with this method than the expression method. Scarification also has been used with some good results.

The X-ray has been used, and claimed of some service by reliable statisticians. Carbon dioxide free snow has been used by the authors in over two hundred cases. I will report on this treatment at a later date. We do not believe any of those methods are effective where the disease is in an advanced stage, and the deep tissues are involved. The excision of palpebral conjunctiva alone

has not been looked on by the authors as a good measure. The pressure on the ball is not removed.

In the following paragraph can our readers answer the questions to their satisfaction?

(1) Can any of our readers make a positive statement from their personal experience whether trachoma in the advanced stage, is curable, or can be prevented by any drug or drugs?

(2) Do they know if the deeper structures are involved?

(3) Will the lesser surgical methods of expression, etc., or any drug correct entropion, or other sequelae without removing pathologic tissue (cicatricial tissue)?

(4) Can we cure chronic interstitial nephritis with drugs?

(5) When trachoma is correctly diagnosed, will the average case remain with the oculist until assured his eyes are well? Can reliable statistics be secured from this type of case? Does he know after a supposed cure, whether the trachoma returns and is not cured? Does he know whether they contract trachoma if again exposed to the infection?

(6) Does he mistake trachoma for chronic conjunctivitis, and refract the patient, and years later the impaired vision and other sequelae reveal a typical case of trachoma? (See case histories 17-18.)

(7) Do the States where quarantine is in force actually quarantine their cases?

(8) Is Trachoma diagnosed in the early stages either by the subjective symptoms of the patient, or the objective signs presented?

(9) Do innocent contractors of the disease know of its presence in schools or other places?

(10) Does the patient complain or show any objective symptoms in the early stage?

(11) Have my readers seen advanced cases without previous treatment?

(12) Have they seen cases of lost vision which had been treated for years?

(13) Have they been able to trace its effect on generations of a family, with and without treatment?

(14) Do our State legislators know of trachoma? And will they establish hospitals for its treatment and place means of prevention in patients' hands?

(15) Will publicity be given to trachoma in the future, as has

already been given diphtheria, foot and mouth disease, and other contagious diseases?

(16) Will drugs ever remove cicatricial tissue, and prevent irritation and pressure on the eye-ball?

ANATOMY.

The eye-lids are folds of skin for protection of the eye-ball. Their free borders form the palpebral fissure. (Fig. 5, e.) The average width of the palpebral fissure is 1.5 cm., in length 3 cm. The dimensions are smaller in women than in men. The margin of the upper lid covers the upper third of the cornea. The lower lid covers the inferior of the cornea. The skin of the eye-lid is very thin and is freely movable. The skin at the free margin is very firmly attached to the tarsus. Fibres of the levator palpebrae muscle are attached to the skin of the lid which lies over the convex portion of the tarsus. (Figs. 6, c and 5, d.) Beneath the skin of the lid is the layer of loose connective tissue without adipose tissue. (Fig. 5, b.) Beneath this layer of connective tissue may be seen the fibres of the orbicularis palpebrarum muscle. (Figs. 5, c and 7, c.) This muscle is a sphincter, and encircles the palpebral fissure. (Fig. five (5.) Some of the fibres of this muscle are inserted into the skin of the lid. (Fig. 5, c.) It arises from the internal canthal ligament and is inserted into the external canthal ligament. (See Fig. 7.) The external canthal ligament is of firm connective tissue, and connects the lateral ends of the tarsal cartilage with the orbit. (Fig. 7-a-b.)

The levator palpebrae superior muscle is inserted by a fan shaped attachment to the whole upper border of the tarsus. (See Fig. 6.) It arises at the optic canal in the orbit. It draws the lid upward and backward over the curve of the eye-ball. Some of the fibres are inserted into the skin of the eye-lid. (Fig. 5-d.)

The muscle of Mueller (*musculus tarsalis superior*) is a small muscle which lies under the palpebral levator. (Fig. 5.) It arises between the bundles of the levator and is inserted to the upper convex margin of the tarsus. This muscle is very variable. (See Fig. 5.)

The lower lid sinks by its own weight. The orbicularis oculi is innervated by the seventh nerve; the tarsus superior by the sympathetic.

The skin is loosely joined to the tarsal cartilage by extremely lax and delicate areolar tissue, which contains no fat. (See Fig 5.) The outer margin of the free border of the lid is rounded and soft. The inner margin is hard and has a sharp edge. This edge lies

smoothly upon the ball. Destruction of the Meibomian glands causes Xerosis of the cornea.

The eye-lid is closed by the orbicularis muscle. (See Figs. 5 and 7.)

The eye-lid is raised by the levator muscle. (See Figs. 5 and 6.)

The anterior margin of the free border of the lid is rounded and has projecting from it the cilia, arranged in several rows. Some times they are planted more thickly on the border than on the cutaneous surface. The glands of Zeiss (sebaceous) empty into the hair follicles, as do also the sweat glands of Moll. The posterior margin of the free border and forms a right angle. It is rounded in certain diseases, such as trachoma. Between the opening of the glands and cilia is a fine, grayish lining, marking the division of the lid into its anterior portion, which contains the orbicularis fibres, skin and cilia, and the posterior portion which contains the tarsus and conjunctiva. A dense fascia (Septum Orbitale) stretches from the orbit to the tarsus and the canthal ligaments.

THE TARSAL CARTILAGE

The tarsi are intimately connected with the conjunctiva and other tissues (See Figs. 5, 6 and 7) and are shaped like a myrtle leaf; their anterior surfaces are convex, to which the orbicularis muscles are attached by firm connective tissue (See Fig. 5); their posterior surfaces conform to the shape of the eye-ball, and are concave; borders of insertion are convex, while the free margins are almost straight. Thickness about .8 mm. and length 20 mm. The superior tarsus is the widest (See Fig. 6). They are continuous with the canthal ligament. (See Fig. 7.) In the tarsus are the Meibomian acinous glands.

PRE-OPERATIVE PREPARATION

Patient is prepared for etherization the same as in any other major operation. The day before the operation the eye-lid is scrubbed with soap and water, then sterile water; washed with bicloride solution 1-5000; then painted with a 15% solution of argyrol, and a moist boric acid pad applied. In cases of severe keratitis we treat this condition if the patient will remain with us long enough, though we must say they want the operation at once, and in the majority of cases we submit to their wishes.

The swelling, ulcers and other symptoms begin to abate at once after the operation. We do not feel these reactions in trachoma should keep one from operating and saving the eye-ball from a possible rupture or panophthalmitis. We have treated those reac-

tions for weeks without any apparent result. 'Tis only a waste of time for the doctor and patient. During my service as oculist for the United States Government I found it impracticable in many parts of the United States to give ether to the patient. On account of lack of assistants, and then in certain tribes of Indians ether was very dangerous, and the Indians resented being etherized, so I was compelled to use cocaine locally, and a tablet of hyoscine, morphine and cactin, internally. By working slowly, and anaesthetizing the part as I worked, I could do this operation, but it consumed about double the time on account of the patient's nervousness. Of late, on account of our time being limited, we perform all of the operations under ether.

INSTRUMENTS USED

One small scalpel.
Two wide fixation forceps (locked).
One small iris scissors (heavy and curved).
One small iris scissors (heavy and straight).
Two iris forceps, curved and straight.
One small dissection forceps.
Strabismus hook.
One wide, thin rubber horn.
Needle holder.
Sutures.
Needles (curved and semi-curved).

THE PROPER PLACING OF SUTURES

We are entering this in the article at this place, to make the step of the operation clear.

In cases of cicatricial trachoma of the upper lid, which have not developed, the sequela trichiasis, or entropion, we have found it practicable to introduce the first suture just above the eyelashes. This suture is pulled tight, so as to coapt the ocular conjunctiva with the strip of cartilage left at the peripheral margin of the eyelid. After the operator is satisfied with the co-aptation, he may reduce the tension of the suture, so the second thread of the suture can be placed readily. The second thread of the suture is placed through the ocular conjunctiva, and passed through the strip of tarsal cartilage, so as to emerge at the same point as the first suture, but a little below it (toward peripheral of lid). This will help to prevent entropion.

(b) In class of cases in which there is moderate entropion, the exit of the first suture should be midway on the lid over the strip of tarsal cartilage. The second thread of the suture should emerge

almost on the line of the eye-lashes. You can increase the entropion by tension on sutures.

(c) Where the entropion presents a very great degree, the first suture should be introduced on the level of the eye-lid and at the frontal edge of the tarsal strip (or at the uppermost edge of cartilage). The second suture is introduced at the conjunction of the skin and mucous membrane of the lid. (This is on the peripheral edge of the cartilage and below the line of the eye-lashes.)

In cases in which it seems impossible to correct the entropion, we would advise the procedure of (c) plus a wide parallel incision through the strip (conjunctival surface) of cartilage: that is, from the inner canthus to the outer canthus. This incision was recommended years ago, and adopted by the late John Green, of St. Louis, who performed so much for eye surgery. Many years ago, before I removed the tarsus, I used this procedure for entropion, in conjunction with other methods, with success. Where entropion exists with great deformity of the eye-lid, we would advise leaving a much larger strip of cartilage than is usual, and by placing sutures as we have advised, the entropion will be helped, and later the cartilage can be removed if necessary.

The best and most sanitary pledget to tie on, and to cause more entropion, is the cigarette drain (rubber), having it extend from the inner to the outer canthus. The space where the drain is not tied should be undermined with a strabismic hook every day, to prevent any new granulations (which may arise, due to limited blood supply). The second best roll in our experience, has been cotton (wet, and then compressed till water is wanting). This cotton should be immersed in argyrol 10% solution. Gauze is the next most practicable. If it is necessary to cause more entropion in the center, tie the suture on a thick pledget, and then tie sutures at inner and outer canthus on smaller pledgets, each one being single, not connected, as in one strip.

The removal of the sutures has been of some concern to us for some time. We have had a number of unruly patients from whom to remove the sutures at the end of the first day. The union apparent to our eye had taken place, and the edges coated as in other cases, which were left in five days. It is our belief, though, that sutures should not be left in the tissues over three and one-half days. We have been removing them at the end of the fifth day: very often they are loose in the tissue at this time, and are avenues for infection. If the roll is not watched closely, in some cases where it is in contact with the skin, when removed pressure gan-

grene will have developed, and the eye-lid will lose skin where pledget is in contact. All sutures should be sprinkled with boric acid powder daily, and right after the operation. This aids in preventing infection of sutures. When sutures are removed, use boric acid freely on the raw and open surfaces on suture holes.

It is not necessary to develop any stitch abscesses if the lid is properly prepared: if pledget used is sterile, and if the sterile sutures are protected until they are tied. Sterile working surface for sutures is absolutely necessary. They should be bloodless, and not handled any more than necessary until tied.

The silk we recommend as most serviceable is the one Casey A. Wood uses. (See page 911 of *Wood's Ophthalmic Therapeutics* for full account of his article on silk.) If this cannot be procured, then a good grade of silk, medium thickness, will answer the purpose. We have not, in our experiences in 402 cases, had any ulcer on the cornea develop from sutures. Sutures are matted, never buttonholed, and are sunken in the remaining tissues of the lid, so that they do not rub on the cornea. I formerly used an ointment on the ball after the operation, but of late I have not used it while sutures are still in situ.

Outside of these facts, we have found out from experience the operator will have to use his own judgment in placing the sutures in order to have more entropion in the center than the canthi, or the same at the canthi where it is necessary to have more than in the center. Once he has the principle, he can judge any unusual cases with contractions or deformities of the eye-lid.

To summarize the method of placing sutures without regard to entropion, it is necessary to place the first thread of the suture beneath the tarsal strip, and emerge right above the eye-lashes. The second thread of the suture is passed through the strip of cartilage, and emerges on the same level with the first thread of the suture. The middle suture can be pulled tight, and tied if the dissection of the ocular conjunctiva is deep; if the dissection is shallow, do not tighten the suture, as the immobility of the ball may be lessened. The two other sutures can be tightened without much danger of causing exposed cornea when the lids are closed.

THE SURGICAL REMOVAL OF THE TARSAE CARTILAGE AND THE PALPEBRAL CONJUNCTIVA

The patient is anesthetized and the eyelid is placed on the stretch so as to have an idea of its natural semilunarity; it is then grasped at the margin and everted to allow the tarsal plate to form the new

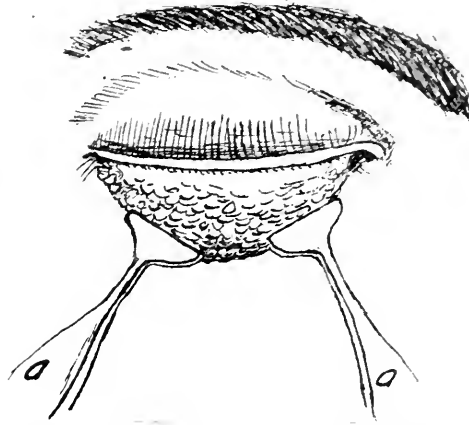


Fig. 1—First Eversion of Eyelid showing the position of fixation forceps and trachomatous palpebral conjunctiva; a-a, forceps.

conjunctival margin. This margin is grasped by two fixation locked forceps, semilunar in shape. Each forceps is placed about midway center between the inner and outer canthi, respectively. (See Fig. 1-a.) If these forceps are properly placed, the operator will have a guiding line for his first incision, and this will be the cause of preventing post-operative measures, such as contraction, partial immobility of eye-ball, and deformities of the inner and

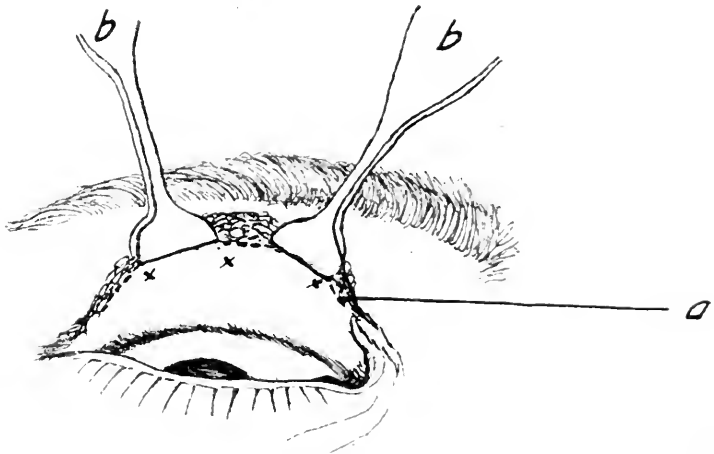


Fig. 2—Second Eversion of Eyelid, showing normal ocular conjunctiva. Line of incision of transitional fold. (Palpebral-Ocular Conjunctiva.) x, points of entrance for sutures in ocular conjunctiva; a, ocular conjunctiva and incision; b, forceps.

outer portion of the eyelid. (See Fig. 2-b and a.) The ocular conjunctiva recedes toward the eye-ball, and very often the inexperienced operator will make his incision too far on the ocular conjunctiva. (See Fig. 2.) The forceps generally used are the ones most operators use for fixation of the eye-ball in iridectomy or cataract work: this forceps is very trying on the operator—its clasp is too small, it unlocks, it is strained, and then slips off of its own accord, still locked, after it is used for a number of times. It is not safe for cataract work, and for those reasons we would urgently recommend its disuse in this operation. (See Fig. 2-b.)

We have seen cases in which the first incision has been at fault, principally due to this forceps slipping when the incision was being made.

After the forceps are in place and securely locked, the conjunctival surface of the eye-lid is now verted with the aid of the fixation forceps. This makes a double version of the eyelid from its natural position, and presents to view the retrotarsal folds and a complete version of the upper lid. (See Fig. 2.)

The operator can now see the transition of the palpebral conjunctiva into the ocular conjunctiva, and the trachomatous and normal lines. (Fig. 2.)

The forceps now place the tissue on the stretch so as to level out the retrotarsal folds and an incision is made clear of the pathologic area as near as possible to the transitional conjunctiva (Fig. 2-b). This transition can be told by the inexperienced operator by the thinness and transparency of the ocular conjunctiva and its loose attachment to the sclera, while the palpebral conjunctiva is thicker, opaque and vascular and firmly adhered to the underlying tissues.

I generally begin the incision in the center with a very sharp scalpel, about one-eighth inch long, and through the sub-areolar tissue of the conjunctiva, and then with a semilunar curved scissors, complete the incision to the inner and the outer canthi. (Fig. 10.) At this point in the operation it is absolutely necessary to fix the ocular conjunctiva, or it will recede towards the ball, and will cause no little trouble in finding it after the hemorrhage has ceased. To avoid this unneeded delay, we introduce a mattress suture in the ocular conjunctiva and have an assistant hold up the conjunctiva, and with a curved small heavy and a straight small heavy scissors, and a small iris forceps, we then dissect the sub-areolar tissues (See *Anatomy of Conjunctiva*) beneath the conjunctiva, and make a deep pocket right to the attachment of the

conjunctiva to sclera and continue the dissection almost to the cornea sclera margin: after this is completed we then place on suture near the inner canthus, and the other suture near the outer canthus (See Fig. 2-x), and dissect gradually on both sides from the center. (Fig. 10.) A strabismus hook very often will separate this tissue by introducing and pushing it on both sides, and thus avoiding hemorrhage. (Fig. 10.) Dull and blunt dissection should be used whenever possible. By dissection as I advise, you will have very little hemorrhage until you strike the arteries of the eye-lid at the outer and inner canthus. The artery at the inner canthus bleeds more freely than its fellow at the outer canthus (See Fig. 8). If the ocular conjunctiva is dissected properly and not too much under tissue included in the dissection, the hemorrhage from the arteries in the center will be very slight. Fig. 2-a-a.) (Fig. 10.)

By leaving the canthi dissection until last, you will avoid this plexus. (Fig. 10.) Hemorrhage has been our chief delay in this work, and every operator will have some trouble if he does not know the anatomy of his part. We find that very hot pledgets of cotton applied constantly as sponges, are of incalculable service. Where haste is looked for, Adrenalin solution is also of service, as well as small haemostats. We do not make it a habit to use the haemostats, as they tear and injure the tissue and infection is liable to occur, due to devitalizing the tissue. We may repeat about antiseptic solutions—15% argyrol is about the strongest antiseptic we use on the conjunctiva.

After the dissection is completed on the ocular conjunctiva, and all hemorrhage has ceased and sutures are in proper place, the double version of the lids can now be restored to the first version. This will bring the position of the fixation forceps on the face. (Fig. 1. It is necessary during this dissection to keep your sutures bloodless and sterile: if not, infection will be liable to follow after placing sutures.) (Fig. 3—Sutures on gauze, resting on face.)

We do not know whether flushing the part after dissection with normal salt solution, or a 2% boric acid solution, is of any advantage in the end result. We formerly used this measure, but at present we use only boric acid sponges and sterile water, and lightly wipe and sponge the part. The conjunctiva is so easily torn we are opposed to devitalizing it any more than we consider absolutely necessary. Every operator develops a certain technic, and measures his success with the one he employs. This is a debatable question in technic—what solutions and strengths we should use.

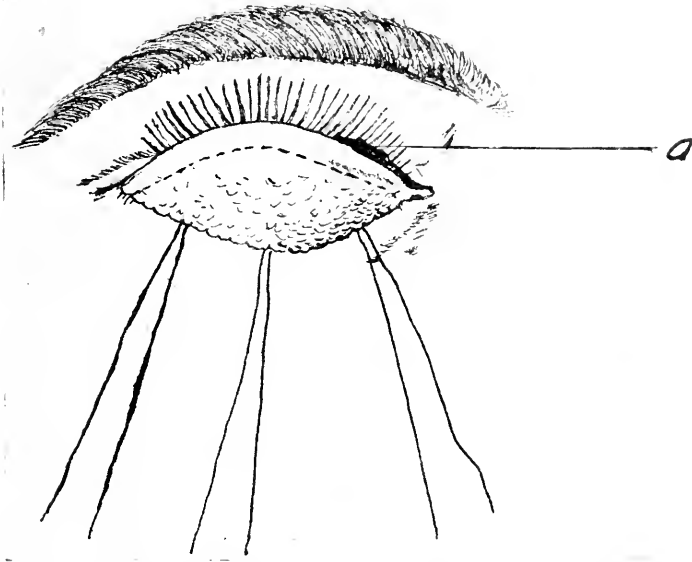


Fig. 3—First inversion of eyelid showing sutures in ocular conjunctiva. Dotted line—line of incision through cartilage; a, marginal edge.

In this dissection, it will be the operator's experience when he makes the curved line incision: He will include all the tissue beneath the ocular conjunctiva, and he will have a very thick flap and will not be able to reach the corneo-sclera junction in the dissection. (Fig. 11.) In old cases of trachoma, this sub-tissue seems to take on a chronic swelling between beefsteak and beginning cicatricial degree of trachoma. (Fig. 11.) This thick ocular conjunctival flap can be left, and the rest of the operation completed; but we find from our experience after the operation is completed, you may have a slight ptosis of the eyelids, some immobility of the ball and a narrow palpebral fissure. We cannot lay too much stress on this point. (Fig. 11.) If the operator finds himself in this predicament when he dissects the ocular conjunctiva, if he is patient and possesses the necessary skill, he can have his assistant hold the flap, and he can dissect the true ocular conjunctiva from the flap. Unless he is experienced, though, we would not advise him to attempt this procedure, as the tissue is easily torn and lacerated, and contracts and loses its natural position, and very often the conjunctiva would be easily destroyed without any warning to the operator.

In this kind of a dissection, there appears to be a great redund-

ancy of tissue flap, and it looks only natural to remove a strip along the entire margin. If this is done, it may be found later that the ocular conjunctiva was removed with the deep tissue back of it, thus producing no sulcus at all, and limiting the excursions of the eye-ball. The dissection of the ocular conjunctiva should only the sub-arcolar tissue beneath it; enough to hold the sutures in order to complete the after steps of the operation. Then again, in certain cases of Trachoma, if the operator dissects too closely to the ocular conjunctiva, of the conjunctiva alone, it will tear and the sutures will tear longitudinal openings, which will mean a new marginal edge will have to be made; and, yes, in some cases, other tissue will have to be picked up in order that your sutures will hold. We are writing on this at length, as we want to impress it on the men who have performed a few of those operations, and with failure complicating, such as immobility of the ball, entropion of eye-lids, etc., and who have pronounced this operation too radical and a failure. If the ocular conjunctiva is dissected as we explained, we feel sure this operation which has been such a God-send to so many on whom we have operated, will finally be taken up by men who heretofore have blamed their failures to the operation and not to their faulty technic. The point to be emphasized: *A true ocular tissue dissection of the conjunctiva, and the proper line of incision at the start, so as not to remove the ocular conjunctiva, and the good results will be obtained by this operation.*

We must warn the inexperienced not to get their curved incision at either canthi too low. (Fig. 11.) It is always better to be higher than seems necessary, as the conjunctiva, especially at the inner canthus, is very deceiving to the operator's eye, due to its semilunar folds. Men whom we have instructed in our technic, always in the beginning make the curve of the incision at the canthi too deep (Fig. 2-a). The incision, though, must be curved at canthi and not straight at those points. If those two points are not closely observed, there will be contraction of the lid and narrowing of the canthi after healing proceeds. (Fig. 11.)

The semi-lunar fold at the inner canthus is much thicker than the conjunctiva at the external canthus.

The second step can now be begun by placing a wide, thin and especially made rubber horn between the conjunctival flap and the posterior surface of the tarsal cartilage. The horns in use are too narrow and thick and do not protect the eye-ball when the cartilage is being excised. It would be a very serious accident to cut down into the ball thinking you were secure with the horn. To avoid

any such accident, we start my incision in the center with a scalpel and continue it with a heavy, dull, curved scissors. The ocular conjunctival flap should be pulled outward and upward by the aid of the three sutures, and the tarsal plate pulled upward and outward, the horn placed between the two and pushed upward on a level with the eye-lashes. If it is placed thus, the danger of injuring the ball is very remote, and the line of the incision in the cartilage is easily adhered to. If we have an extra assistant, we have him evert the free marginal edge of the conjunctival surface of the eye-lid with both hands, and have the other assistant make tension on the forceps, which are still attached to the free tarsal edge of the cartilage, and with a sharp scalpel, make a semilunar incision through the palpebral conjunctiva, and tarsal cartilage to the horn beneath, about one-fourth inch long, two (2) mm., from the lid margin in the average case. We then complete the semilunar incision with a heavy, small curved scissors, from both sides of the incision to each canthus, all the time keeping high up, especially higher than one thinks necessary as you approach the canthi, thus leaving only a small strip of cartilage. My great fault in my early experience with this operation was that though I would start the incision right, as I would reach the canthi, I would leave too much of a strip of cartilage, over-balancing my center strip. At that stage of my experience, I had no assistant to hold back the margin at the canthi, and due to the lid natural curve at those points, I would have a slight inversion at the extreme margin, thus completing the incision lower than desired. After inspection of the incision. Sometimes the mistake can be made in removing all the cartilage at the canthi curve, thus causing entropion. In every case to avoid those errors, you must see the whole surface length of the proposed incision, and have the margin slightly *over-inverted* when making the incision. If care is not used in ending the incision through the cartilage at the canthi, the skin of the lid will be button-holed, unnoticed until the lid is inverted.

In some cases, removal of the tarsus is performed easily, there are few adhesions, and the tarsus is hard. In others, the tarsus is small and shrunken. The lid margin very often in those cases changes its shape from a right angle to an obtuse angle, and is not sharp. In other cases, the lid is contracted in the center and puckers and causes deformity, due to cicatricial conjunctiva and shrinking and rolling up of the tarsus. (Figs. 6-a, 5-c.)

When you dissect the other tissues with the ocular conjunctiva, it is easy to button-hole the skin of the eyelid. The under surface

of the skin of the eyelid glistens like the conjunctiva of the inner canthus, and is deceiving in very chronic cases, and to the beginner. In one case I recall a very large piece was removed, and only on inverting the lid was the error noticed. I feel this accident is liable to happen with beginners and careless workers. The proximity of the incision to the margin will depend on the experience of the operator and conditions of entropion to be met. In my early experience, I left an undue wide strip so as to prevent entropion, and to conform to the shape of the eyelid. Year by year I am leaving very little cartilage, and in some cases where there is no entropion, I remove practically all the cartilaginous strip, and leave only a mass of tissue hard to the touch. In those cases, the patients go on to a speedy improvement. It is hard to say how much to leave as entropion and other deformities may develop with operators of limited experience. After the cartilage is removed, the remaining strip should be undermined slightly in order to increase the coaptation of the flap. Do not over-stretch the flap with the center suture, as you may widen the palpebral fissure unduly at this point, or cause immobility of ball, and thus produce a subjective symptom for the patient. The ocular conjunctiva, especially in the center dissection, should be deep in order to help those mistakes which are liable to happen. The excised portion of the tarsus is now held up with a forceps, and muscle and tissue is dissected from the anterior surface of the cartilage until the free margin is reached, when the conjunctiva of the posterior end of the cartilage can (or the beginning of the first incision in the ocular conjunctiva) be excised.

If none of the redundant tissue beneath the cartilage, and be-

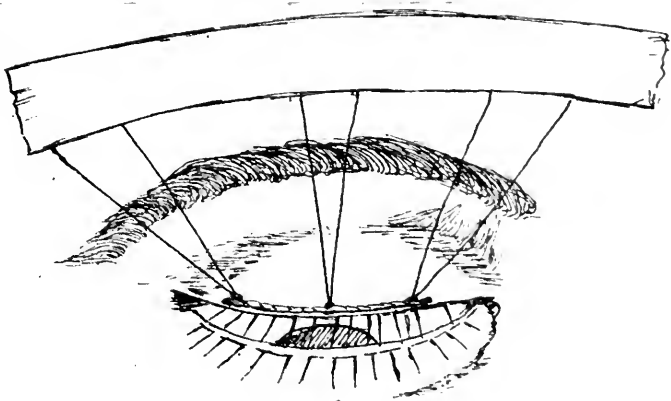


Fig. 1.—Sutures tied on skin of Eye-lid over roll.

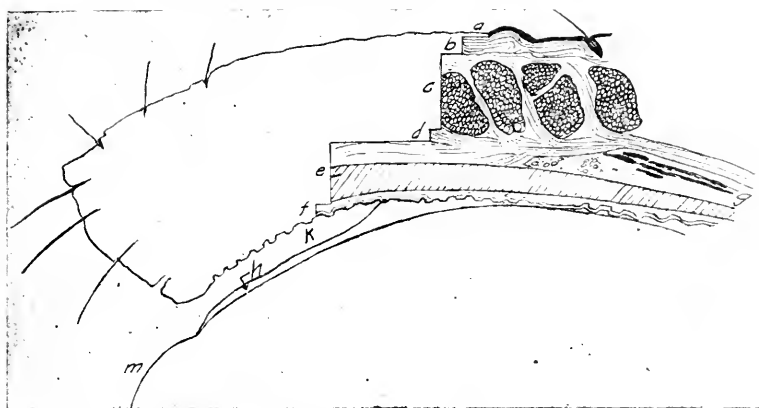


Fig. 5—Section through Eye-lid; a, skin; b, connective tissue; c, orbicularis palpebrum; d, levator palpebrae superioris; e, tarsus superior; f, conjunctival palpebral; g, Mueller's musculus tarsalis superior; h, conjunctiva-ocular; k, fornix; m, cornea.

neath the ocular conjunctiva, is removed, the ocular conjunctiva flap can now be apposed to the strip remaining of the cartilage, and sutures introduced in order (explained under the heading of Sutures).

How much tissue should be removed after the removal of the cartilage, is a mooted question in some cases. Tissues in the normal lid do not present a hypertrophied appearance as is found in many

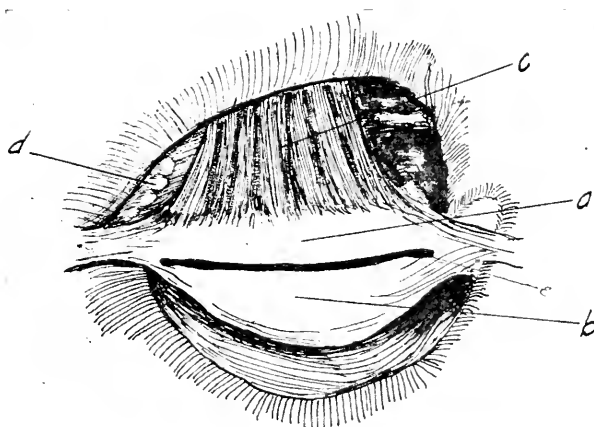


Fig. 6—a, Tarsus superior; b, Tarsus inferior; c, Levator palpebrae superioris showing attachment to tarsus. (Note—If this muscle is excised with other tissue by the inexperienced operator, ptosis of the eye-lid will result.) d, Lachrymal gland. (Note—When incision is made through the cartilage very often the lachrymal gland is cut, causing prolapsus of the gland. The inexperienced operator will remove the prolapsus, thinking it excess adipose tissue.)

cases of trachoma. We have seen the connective tissue almost resembling a muscle in thickness. Where we believe it will interfere with coaptation of the new conjunctival covering, we excise it. The levator palpebrae superior is dissected free of the tarsus, and not removed, as this is the muscle which elevates the lid. It is strange enough to state we have excised half of this muscle in hypertrophied cases, and we have not suffered in my result from ptosis (Fig. 5). We feel at least half of the length of this muscle can be excised and you will have no ptosis. When redundancies are removed, of course, the final returning to the cosmetic appearance of the lid is hastened, but it should not be forgotten that the safest procedure is to leave all the muscle, even though the conformity of the lid does not regain its shape as quickly as nature will, in time, absorb the redundant tissue, and no ptosis will result (Fig 6-c). The palpebral fissure in those cases in which the redundant tissue is excised, the patient can open his eyes in two weeks' time wider than he could for years. The orbicularis muscle is a sphincter muscle, surrounds the whole tarsus, and is fastened to the canthal ligaments. When dissection at the canthus is finished, very often the operator will grasp this seemingly excess tissue and excise it; but by so doing, he is liable to have slight ptosis at the canthal lid margin, especially if the muscle fibers are atrophied (Fig. 5). When the canthal ends of the tarsus are cut, it should be his duty to excise the cartilage and leave the canthal part of this muscle, thus preventing non-conformity of the lid, and drooping (Fig. 7-a and b). This muscle closes the eyelid (Figs. 5 and 7). Mueller's

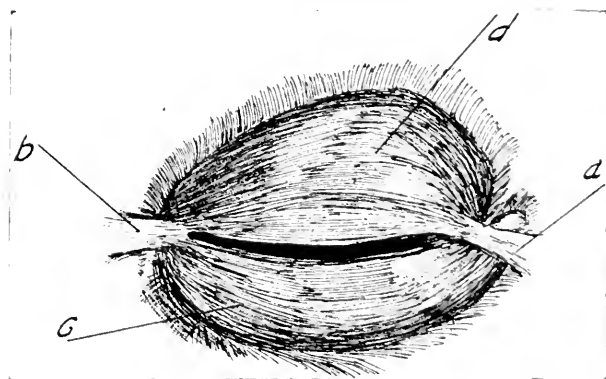


Fig. 7—a, Raphe palpebras lateralis; b, ligamentum palpebrale med.; c, orbicularis palpebrum superior; d, orbicularis palpebrum inferior. Note blending of orbicularis muscle fibers with a and b. These fibers are excised by the inexperienced in this operation and very often the causing ptosis of the eye-lid.

muscle is a very small muscle (Fig. 5-g), and blends with the levator, and is attached and lies on the tarsus. The septum orbitale (a dense fascia) assists in the movement of the lid, and is intimately blended with the tarsus, and should not be wantonly excised. In removing the tarsus, we can only repeat, do not remove the orbicularis muscle at its canthal ends. (See Fig. 1, a, b, c.) Some adipose and connective tissue will be found, and in seemingly large amount. This can be removed to facilitate dissection and smoothness. The Meibomian glands should not be destroyed, though I have removed all tissue in this region, and years afterward I have seen the patient, and no xerosis of cornea developed. Trachoma, in many cases, is seemingly destructive to the glands, but in my experience I have met with only a small per cent of xerosis of the cornea. I have seen old Indians 90 years of age who have had trachoma all their lives, and still did not present xerosis. If I may be permitted, I will make the same statement in regard to cilia. The cilia continue to grow, even after the destructive damage of the trachoma, or after the extirpation of their supposed glands, and in many cases after the extirpation of the pathologic tissue, new cilia appear and grow very fast.

The lachrymal gland, we feel, loses very little of its functions in trachoma, and we consider it inadvisable to remove it. (Fig. 6-d.) Sometimes the operator will open the gland when he is excising the cartilage, thus causing it to hang down. This can be excised. If he is careful in his dissection at the outer canthus, this accident can be avoided. (Fig. 6-d.)

The puncta lachrymalia and the canaliculi no doubt, are affected in trachoma to a considerable degree, but we believe most of the annoyance of tearing on the cheek is due to the shallow sulcus of the lower lid, which is caused by the disappearance of the transitional folds (drains) and the changes in the plica semilunaris. Probing those ducts supports me in this statement; and in removing the cartilage, the puncta should be guarded, and also the introducing sutures. (Fig. 3. Position of Sutures.)

We realize the ideal method, and to be positive all trace of trachomatous tissue should be eliminated, and excision of all sub-tissue should be our aim. This, of course, would be a radical measure as far as it related to the cosmetic effect on the eyelid. We feel though, if it is a case of saving the vision, the cosmetic effect should be secondary. Every operator will have to decide for himself as far as his experiences have taught him, how much tissue to leave.

or how much to remove. We trust our experience will help those who are on the balancing point.

The microscopical pathologic appearances will help. Of course, the microscopical examination would be the ideal way, but this is impracticable.

CANTHOPLASTY.

In a few of my cases, we found it necessary to perform a canthoplasty, in order to give the patient more freedom of movement of the eyelid. (Fig. showing outer canthus.) We fully agree with Casey A. Wood—this operation in many cases proves a failure if the external canthal ligament is not incised at right angles to the primary incision. The conjunctiva, or skin in this incision of the ligament need not be injured in the hands of a dextrous operator. This operation will also be of benefit in case the inexperienced oper-

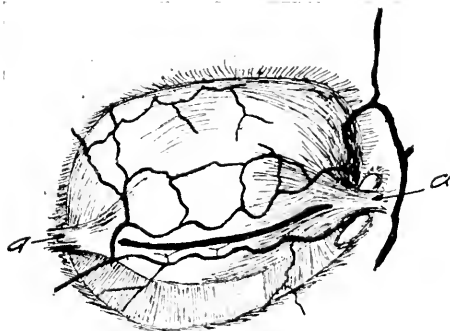


Fig. 8—Arterial Circulation of the Eyelid. Profuse hemorrhage is caused by excising the arteries of the inner and outer canthal ligaments; a, Ligaments.

ator tucks up or removes more of the canthal ocular conjunctiva than is necessary, thus producing a narrow canthus.

We are of the same belief as McCallan, of Egypt, there is no treatment of pannus, *per se*. The procedure is to remove the disease from the lids. Periotomy and periectomy have not been of much avail in our hands. The only procedure with which I have met success, is pannus dissection. (See Daniel W. White's Brochure on Trachoma. Report of 35 cases.) This, in itself is working against pathology of the part, leaving the diseased lid. Corneas clear up after the removal of the tarsus and palpebral conjunctiva. This is the only true method. It will not be amiss at this point to warn the oculist in operating for cataract on trachomatous eyes. In our experience the cataractous lens has been hard to deliver, as

the elasticity of cornea wounds were less than in cases without cataract. The wounds in those cases do not heal very well, and often as late as the fifth day, you will have iris prolapse, or an open section. In case you attempt to deliver the cataract, always have a large section. The best operation in our hands for slight cases of ptosis is the Panas with Dr. Frank Allports' Modification.

We have mentioned the principal sequelae of trachoma, and their surgical correction.

We do not operate on the lower lid unless we find the upper lid does not produce the expectant results. We have only operated on the lower lid in about sixty-five cases: in 402 cases in which we have removed the tarsus and palpebral conjunctiva. In not over fifteen of those cases did I consider it necessary to operate. In the

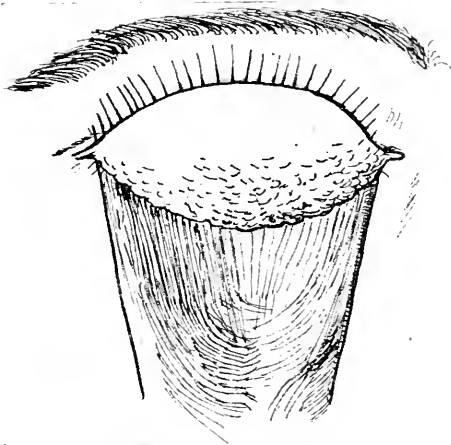


Fig. 9—Author's Spoon.

great majority of the impaired vision cases, the involvement begins superiorly, and when the pathologic tissue is removed, an immediate improvement is noticed. A small area of the conjunctiva is dissected and removed. It is not necessary to do anything further. The removal of the cartilage is not necessary. If it should be removed, entropion is liable to result. When entropion presents, it should be corrected by the proper entropion operation. There are many good operations in use. In case ectropion is present, the operator will find one of the bug-bears in surgical trachoma. I have performed every operation known for this condition, many were complete failures after six months, and re-operation was necessary, and then results were not much better. The marked degrees of ectropion (the thick beefsteak variety) which made the whole

tion; argyrol solution is instilled, and in some cases we use yellow oxide ungt. one-half per cent. The end of the sutures are loosened on the skin of the forehead, and any undue tension is relieved. The external surface of the eyelid is washed with boric acid solution and argyrol, powdered boric acid is used, and a compress applied, which is fastened above, and on the nasal and temporal side of the face, thus allowing an opening beneath, through which the patient can see. At the end of the third day, the sutures are removed. Very seldom they are left in situ until the fifth day. The eyelid is massaged from this time on, and copper sulphate, tannic acid, boric acid solutions with yellow oxide ungt. are used indefinitely. It has been my experience for cases to continue to improve after this operation without any after treatment at all. I institute this treatment only as a supposed helping measure, and where the lower lid is still

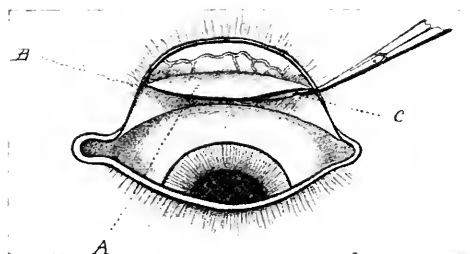


Fig. 11—A, Ocular Conjunctival Dissection Flap, too DEEP and THICK; B, Wrong Ocular Conjunctival Incision; does not reach the **Canthi**; C, Redisection of the Thick Flap.

trachomatous. I do not feel that the lower lid plays a very important part in trachoma, as our cases of impaired vision cleared up as well without operating on the lower lid. In cases of entropion of the lower lid, then surgical intervention is necessary for a successful operation, and for the good of the patient. The patient is able to resume his work in a week's time after the operation; or if his work is very important, with a little discomfort, he could resume it in three days. We see the patients every day for one week, and then gradually decrease their visits, until we see them once a month, keep them under observation for six months, then have them report three times a year.

Case No. 1. August 9, 1914. Residence, Kansas. Age 21 years. Occupation, farmer. R. W., male. Vision: O. D. 20/20. O. S. 20/20. Diagnosis: Beefsteak trachoma (advanced stage). Treatment: Advised removal of tarsus and conjunctiva. Refused opera-

tion; placed on astringent treatment: Copper sulphate, tanno-glycerin, boro-glycerin, yellow oxide ungt, iodoform.

Under date of February 16, 1915: Excessive beefsteak hypertrophy cleared up. Eyelids show considerable cicatricial tissue and are very leather-like to the touch. Patient thinks he is about well. Can open eye lids wider. Treatment only helped hypertrophy. This patient is liable to involvement of his vision within ten years. The cicatricial condition in his lids will continue and any irritation or foreign body in his eye may produce serious results on his cornea. This is a typical case where time with the disease does the gradual and terrible damage to eye lid and vision.

Case No. 2. May 9, 1914. R. B., female. Residence, Arkansas. Age 38, married, housewife. Vision: O. D. 20/15, O. S. 20/15. Diagnosis: Hard and rough hypertrophy (almost final stage). Cornea dull, no luster. Could not submit to operation we advised on account of her physical condition. Placed on astringent treatment, copper sulphate and yellow oxide ungt. Cornea presents little more luster. Eye lids show bumps of hard (bloodless) cicatricial tissue. There is no doubt in my mind that this case will have impaired vision within five years, even with present treatment, as soon as the cornea becomes divitalized. This case will present pannus siccus—a pannus not detectible to the average examiner's eye. Ptosis is prominent symptom at the present time. Her daughter, age five years, does not have trachoma.

Case No. 3. April 8, 1914. B. L., male. Age 30, married, driller. Residence, Missouri. Vision: O. D. 20/40, O. S. 20/40. Diagnosis: Advanced trachoma—smooth, thin, cicatricial eye lids. Cornea hazy. Keratitis and congestion of cornea. Could not work for five months.

Operation: Removal of cartilage and palpebral conjunctiva. Working in two weeks' time. Vision at six weeks 20/20. Keratitis cleared up. Had treatment previously for five years. His wife in final stage of trachoma. Eyeballs appear clear to inexperienced. Has good movements of eyelids. Vision: O. D. 20/200, O. S. 10/200. Treatment all her life. We advise removal of tarsus and palpebral conjunctiva. Her habitat up to eight years ago was Illinois.

Case No. 4. May 15, 1914. R. J., male. Age 26. Residence, Arkansas. Laborer. Vision: O. D. blind, O. S. light perception. Diagnosis: Old trachoma and dense pannus.

Operated: Removal tarsal cartilage and palpebral conjunctiva.

On July 22, 1914, right eye 20/60. Gain of 50% in vision. Left eye 20/50. Gain of 62½% in vision.

This man had not been able to work for two years. He was led to our office for pre-operative treatments. Two months after the operation he could read newspaper print, and gained 23 pounds and was earning \$2.00 per day driving a team. He had been treated for over ten years without much improvement. Had been refracted six times in two years and glasses prescribed.

Case No. 5. Q. M., female. Age 20, married. Residence, Texas. Vision: O. D. 20/40, O. S. 20/40. Diagnosis: Old cicatricial trachoma.

Operated: Removal of tarsus and palpebral conjunctiva. Three weeks after operation read 20/20 in each eye. Treated for years prior to this time. Secured no relief from symptoms. Baby two years old has trachoma. Her husband has not contracted it.

Case No. 6. March 1, 1914. E. S., female. Age 50, married. Residence, Kansas. Vision: O. D. light perception, O. S. 20/50. Diagnosis: Old beefsteak trachoma—pannus siccus. Her trouble was diagnosed refractive error. Changed glasses every year until gradually lost vision in right eye. Advised removal of tarsus and palpebral conjunctiva.

Case No. 7. September 15, 1914. S. E. C., male. Age 20. Photographer. Residence, Pennsylvania. Vision: O. D. blind, O. S. 20/50. Diagnosis: Hard beefsteak cicatricial trachoma and pannus. Four months previously had foreign body in right eye. Complained of no trouble until this time with his trachoma. This added irritation with his trachoma practically has destroyed his right eye. Cornea dull. Performed removal of tarsal cartilage and conjunctiva. After two weeks of treatment his eyes improved 50% in vision, and with this improvement he left Tulsa.

Case No. 8. June 25, 1914. S. E. J., female. Age 18. Residence, Oklahoma. Vision: O. D. 20/15, O. S. 20/150. Diagnosis: Old cicatricial trachoma. Pannus, entropion. Had treatment at Government Indian schools for four years. Gradually become worse. Advised removal of cartilage and conjunctiva.

Case No. 9. September 10, 1914. S. E., male. Age 20. Farmer. Residence, Texas. Vision: Blind, O. D. and O. S. Diagnosis: Old trachoma and cataract. Had cataract removed at Kansas City. Eye lost in operation. Treatment: We refused to remove cataract in left eye until trachoma was eliminated. (See note in paper about cataract.)

Case No. 10. March 7, 1911. B. Vision: Blind. Diagnosis: Slight beefsteak trachoma, pannus, intense keratitis. Operation: Removal of tarsus and palpebral conjunctiva.

This little boy was an orphan supported at the Charles Page Orphans' Home, Sand Springs, Okla., and required a special nurse to take care of him. I made an inspection of the eyes at this home nine months later, and was glad to note this young boy had normal vision and had gained in his physical and mental condition. This was the youngest case I had, and today his eyes are normal, and it would be impossible to show he had been operated on.

Case No. 11. March 7, 1911. D. S., female. Age 15. Residence, Oklahoma. Vision: O. D. 10/200, O. S. 5/200. Diagnosis: Smooth cicatricial trachoma. Deep, smooth, clean nebulæ.

Operated: Removal of tarsus and palpebral conjunctiva. The girl was a sister to D. M., and I might add here, it was not known she had trachoma. Had been refracted. Vision in her case at present time, O. D. 20/40, O. S. 20/30. Will refract her in six months' time, if necessary. The girl is an orphan at the Charles Page Orphans' Home. There are two more sisters afflicted with trachoma and one brother at this home. Some of the orphans from ages of eight years to twenty years have trachoma in the last stages. The State of Oklahoma could well pattern after Mr. Page's charity for its orphans by having them treated for trachoma by experts. By so doing they would be removed from State help at their maturity, with vision to earn a living, and would be a credit to themselves and to the State.

Case No. 12. March 7, 1911. D. M., female. Age 17. Residence, Oklahoma. Vision: O. D. 20/200, O. S. 5/200. Diagnosis: Cicatricial trachoma, pannus siccus; deep, clear nebulæ.

Operated: Removal of tarsus and palpebral conjunctiva. Was unable to read in school and was very anxious to continue her studies. She is an orphan at the Charles Page Home. She has a high degree of myopia, but as yet we have not corrected this, due to the deep nebulæ. Vision: O. D. 20/60, O. S. 20/40.

Case No. 13. January 27, 1914. J. H. A., male. Age 48. Farmer. Residence, Illinois. Vision: O. D. 20/200, O. S. 10/200. Diagnosis: Cicatricial trachoma, pannus, nebulæ. History of starting four years ago. The author believes he had trachoma over thirty years. Previous treatment for four years only improved the constant reactions. Advised removal of tarsus and palpebral conjunctiva.

Case No. 14. April 27, 1914. J. S. D. Age 35 years. Married. Residence, Iowa. Vision: O. D. 20/200, O. S. fingers. Diagnosis: Old cicatricial trachoma, pannus siccus, nebulae.

Operated: Removal of tarsus and palpebral conjunctiva. On June 15, 1914, two months after the operation, he improved 50% in vision (20/50) in right eye. Improvement in left 10%. Has had continual improvement until today, February, 1915, ten months since the operation. He can read a newspaper and has a card vision of 20/15. This man had treatment in all the big cities of the United States for the last 15 years, also had treatment in Fuchs' clinic in Germany. Money and care was no object to him. His family is free of the disease.

Case No. 15. January 21, 1914. C. F., female. Age 25 years. Married. Residence, Oklahoma. Vision: O. D. 5/200, O. S. 5/150. Diagnosis: Thick beefsteak trachoma, pannus, entropion.

Operated: Removal of tarsus and palpebral conjunctiva. Four months later improvement in vision 65%. Have not seen this case since. This woman had treated for 15 years at Government schools with little result. Her three children have trachoma. Her husband is free from the disease.

Case No. 16. August 15, 1914. A. E., female. Age 22. Residence, South Carolina. Vision: O. D. 20/15, O. S. 20/15. Diagnosis: Cicatricial trachoma of the lower eyelids. Upper eyelids normal. Complained of tearing on cheeks, which caused cheeks to chap in cold weather.

Treatment: Yellow oxide ungt. and thiosianamine internally and externally. Will remove conjunctiva later if tearing is not improved. This is due to destruction of transitional folds. The anatomy of lower eyelids explains why the vision is still intact. (See Anatomy.)

Case No. 17. January 12, 1915. H. L., male. Age 37. Married. Residence, Colorado. Vision: O. D. 20/20, O. S. 20/20. Diagnosis: Chronic conjunctivitis.

Treatment: Refracted and directed patient to carry an astringent treatment. This case presents a border line case, which gives great difficulty in diagnosis. If the hypertrophy does not clear up in one year, we will advise removal of tarsus and palpebral conjunctiva. Cases of this type have come to us after having consulted very able men, and I found by using the sandpaper operative procedure I am able to make a positive diagnosis. I remove all the hypertrophy and find beneath this swelling beginning cic-

trization of the lids. This case would not submit to the operation. Be very careful in making a diagnosis in such a case.

Case 18. February 8, 1910. B. L., female. Age 52. Married. Residence, Missouri. Vision: O. D. 20/60, O. S. 20/70. Diagnosis: Chronic conjunctivitis.

Treatment: Removed excess hypertrophy with White's silica rasps (sandpaper) and then made diagnosis of beginning cicatricial trachoma. Patient had been to Chicago, Kansas City and St. Louis. All men she consulted refracted her. She knew more about her condition, she thought, than I did. Placed on treatment. Six months later vision was 20/40 O. D. and 20/50 O. S. I then advised removal of tarsus and conjunctiva.

Case No. 19. September 12, 1914. H. B., female. Age 14 years. Residence, Texas. Vision: O. D. light perception, O. S. 20/20. Diagnosis: Hard, cicatricial trachoma with sarcomatous pannus in left eye; right eye normal.

Operated: Removal of tarsus and conjunctiva. Six weeks after operation cornea much clearer. Patient distinguish hand. Three months after operation patient count fingers dimly. Pannus is gradually clearing up. This is the most fleshy pannus I ever examined. If it does not clear up to my satisfaction, I will do a pannus dissection. This is indicated since the trachomatous lid has been removed. This young girl has been treated for years with no improvement. I am sorry to say she presents a ptosis of long standing, which may require another surgical measure. I will give her lid time to improve since the pathologic tissue has been removed. Her people are pleased with her improvement.

Case No. 20. H. L. J. Age 46. Male. Civil engineer. Residence, Minnesota. Vision: Fingers, O. D. and O. S. Diagnosis: Cicatricial trachoma of eyelid and eyeball. This man had been treated for years by the best oculists in the United States, but with all this his vision gradually became impaired. He traveled all over the country for relief. When we saw him, it was during hot weather. Advised him to go home and return later. He had a nurse with him on account of morphine habit he acquired due to his eyes. We advised removal of tarsus and conjunctiva and also placed him on weak absorbents and removed all astringents, as we believed his cornea was being robbed of any regenerative power by constant use of astringents. Do not use astringents too long. This is a case we will not promise much improvement from removal of tarsus, as I feel all vitality of the cornea tissue is

about gone, and the regenerative power is not in the tissue. The operation will improve what vision the patient has.

Case No. 21. February 6, 1911. G. C. M., female. Age 40 years. Residence, Ohio. Vision: O. D. 20/100, O. S. 20/100. Diagnosis: Very advanced cicatricial trachoma, eyelids and eyeball. Cornea presents a dull luster and deep nebulae.

Operated: Removal of tarsus and conjunctiva. This patient did not gain like other cases. Her vision has remained about the same. She never has any more of the constant reactions. At times she does not see as well as at other times. The cornea is very sensitive to astringents. I firmly believe she has been over-treated (the cornea) with astringents, and the vitality placed at a low ebb. Entropion has been prevented with treatment. I feel, though, it would have been better to have allowed the pannus to form, as a protection to the corneal sub-tissue. Pannus, really after all, protects the cornea from the hard-rubbing eyelid. Will perform a canthoplasty on these lids very soon. This woman had treatment in every part of the United States, and was having constant reactions until she consulted us.

Case No. 22. October 5, 1914. R. J., male. Age 24. Residence, Oklahoma. Vision: O. D. 20/15, O. S. 20/20. Diagnosis: Granular trachoma.

Treatment: Astringent treatment. Case appears well. Will observe for another six months. This case was light. The follicles were soft and principally on upper lids. This type of case we would recommend medicinal treatment, but would not promise a cure, except we could observe the case for two years. Never promise a cure in those cases. *The deep tissues are not involved.*

Case No. 23. May 26, 1914. Female. Age 14 years. Residence, Missouri. Vision: O. D. light perception, O. S. fingers at 8 feet. Diagnosis: Cicatricial trachoma, pannus and nebulae.

Operated: Removal of tarsus and conjunctiva. This girl came to us from the State Blind School, and was unable to see to reach our office alone; she was brought daily by a friend. In three weeks' time she was able to come to our office alone, the first time she had been able to be on the streets alone in three years. Shortly she hired out for her room and board. She was still improving the last time she called at our office. She had been treated for years without result.

Case No. 24. M. Female, age 44 years. Married. Residence, Nebraska. Vision: O. D. 20/70, O. S. L. P. Diagnosis: Inter-sital Keratitis with Pannus.

Treatment: Syr. ferrous iodide, bichloride of mercury tablets gr. 1/50, yellow oxide ungt. Atropin sulphate and dionin. The eyes cleared up under this treatment. A diagnosis of trachoma and treatment was instituted by other men before we saw the patient. She had three Wasserman's made, and also a Luetin test, each one proving negative. She had a rheumatic history, and had erysipelas and bariola six months ago. I mention this case on account of the pannus formation and the error a man could make in diagnosing.

Case No. 25. J. M. Female. Age 13 years. Residence, Oklahoma. Vision: O. D. 20/200, O. S. Fingers. Diagnosis: Hard beefsteak trachoma. Intense Pannus.

Operation: Removal of tarsus and conjunctiva. This young girl was almost blind, and could not read or leave the house at night. She had continual reactions, and presented ptosis of a spasm type which was very annoying. In seven months' time her vision was 20/30 in each eye and she had gained 17 lbs. in weight. NOTE: The author could recite case after case from his Government records from the different states, from the very young to the aged. He also has private records at his disposal. The author feels his readers will have enough data in those cases to form their opinion.

Case No. 26. H. Female, age 40 years. Housewife. Residence, Texas. Vision: O. D. and O. S. Fingers. Diagnosis: Smooth cicatricial trachoma of eye-lid and eye-ball. Marked entropion and symblepharon of upper lids.

Operated: Removal of tarsus and conjunctiva. This tarsus was almost entirely atrophied. The lid conjunctiva was symblepharized to the ball; most of this was corrected in two operations. Still have slight rubbing of posterior margin of eye-lid on eye-ball which keeps the old pannus active. When the lid is held off the eye-ball the cornea clears up. She has a xerotic condition in left eye. We feel this is due to the trachoma. Vision in right eye 20/70, in left eye 20/200. This is another example of over-treatment of trachoma, and are unfavorable cases for the operation, even though it stops the disease and improves the patient's vision 10 to 15 per cent. In those cases if the eye-lid could be held entirely off the ball our success would be 25 per cent more. Cases of long standing and long expert astringent treatment, we would advise oculists not to promise patient much improvement.

Case No. 27. M. A. J. Male, age 13 years. Schoolboy. Resi-

dence, Texas. Vision: O. D. 20/30. O. S. 20/30. Diagnosis: Vernal catarrh and cicatricial trachoma.

This boy was operated on by removal of tarsus and conjunctiva: was able to attend school one month after the operation. The first time in three years. He could not open his eye-lids before the operation, and had pronounced ptosis and photophobia was very bad. He had every other form of treatment by good men in the big medical centers. He made two grades in school last year.

Case No. 28. May 10, 1911. M. T. Female, age 19 years. Single. Residence, Oklahoma. Vision: Light perception O. D. and O. S. Diagnosis: Cicatricial trachoma. Dense pannus, nebulæ, entropion distichiasis.

Operated: Removal of tarsus and palpebral conjunctiva. This girl was led to the hospital; in three weeks' time she returned to the doctor's office unaided, for treatment. The oculist had given up the case after treating her for three years. She has married in the last year, and can read large print, and do all her house work. She was only able to dress herself before this time.

Case No. 29. April 8, 1911. W. T. Male, age 11 years. School-boy. Residence, Oklahoma. Vision: O. D. 20/100, O. S. fingers. Diagnosis: Thick beefsteak trachoma. Pannus and nebulæ.

Operated: Removal of tarsus and palpebral conjunctiva. This boy had attended Government school, and was not able to attend classes, due to his impaired vision. Finally the Government sent him to an oculist who treated him for six months, without benefit. Three months after the operation this boy was able to read in school, and gained nine lbs.—(From *Government Reports*, by D. W. White.

Case No. 30. May 7, 1910. H. H. Male, age 16 years. Residence, Florida. Vision, L. P. Diagnosis: Cicatricial trachoma. Deep pannus and nebulæ.

Operated: Removal of tarsus and palpebral conjunctiva. This man was an old Indian chief, and was opposed to "white man's medicine." He had been blind for seven years and had to be led to town. Shortly after the operation he removed two sutures, and the nurse in charge telegraphed me to return at once. I was about 250 miles away. I was unable to return within three days, and to my surprise, there was union of the coapted edges. In six weeks' time this man was able to come to the Government office unaided. He is still alive, and can be seen on the streets every week without any assistant.—From *Government Reports of Daniel W. White*.

Case No. 31. April 5, 1910. Male, age 68 years. Married.

Residence, South Dakota. Vision: O. D. and O. S. L. P. (Blind). Diagnosis: Old, hard beefsteak trachoma. Pannus, sarcomatous entropion.

Operated: Removal of tarsus and palpebral conjunctiva. This case was a very interesting one. This man was an old "Indian medicine man" to his tribe of Cheyennes. During my stay at this point he preached against me, in advising Indians with "sore eyes" to come to him. He was the Spirit and Healer. One night he came to the hospital and agreed to an operation if I placed him in a private room, and not tell other Indians. I agreed, and operated. His improvement began at once. In five weeks' time he could find his way unaided. The Indians heard of his operation and flocked to this point from a radius of two hundred miles. We had to secure five nurses and one large school building for a temporary hospital. From this time on trachomatous Indian patients were numerous, and desired to be treated. The Government doctors and private practitioners prior to this time, had lost the Indians' confidence in treating "sore eyes," as their success was very limited.—From *Government Reports of Daniel W. White*.

Case No. 32. May 8, 1912. J. B. Male, age 29 years. Expert stonemason. Residence, Indiana. Vision: O. D. 20/200, O. S. F. P. Diagnosis: Beefsteak trachoma. Nebulae and pannus, trichiasis.

Operated: Removal of tarsus and palpebral conjunctiva, for a prominent oculist. In ten days' time patient came to office unaided. His eyes cleared up from intense congestion. The oculist thought the measure very radical at the time, and also considered the eyes too inflamed. In two weeks' time the patient insisted on having the other eye operated. I operated at the oculist's request, and had good results. While I was in a Texas hotel a year later a man came up to me, shook hands and told me who he was. He had gained 28 pounds, was working, earning \$7.00 a day. Had not worked for two years prior to this time, on account of failing vision. Said a doctor had attempted to evert his lids, but could not. He then told the doctor about the operation. If the operation is performed correctly there will be no sign of any operative procedure on the lid to the close observer. The oculist did not know he had had an operation.

Case No. 33. March 6, 1910. T. P. Male, age 50 years. Farmer. Residence, Oklahoma. Vision: O. D. 20/100, O. S. 20/70. Diagnosis: Hard beefsteak trachoma. Pannus. Very marked entropion of lower lids.

Operated: Removal of tarsus and palpebral conjunctiva. Correction on ectropion by Dr. Daniel W. White's new operation. This case was unusual to the extent—the pannus on the lower cornea did not clear up until the ectropion was corrected. I attempted to correct the entropion at the time of the removal of tarsus, but the operation did not give very good results until I used my own technic. This man gained in vision to 20/30 O. D. and 20/40 O. S.

Case No. 34. May 7, 1910. T. I. P. Male, age 44 years. Policeman. Residence, Oklahoma. Vision: O. D. 20/50, O. S. 20/60. Diagnosis: Beginning cicatricial trachoma and pannus.

Operated: Removal of tarsus and conjunctiva. In this case I had a very marked entropion on upper lid to develop; must have been my technic. Had to correct this condition. Vision in three month's time O. D. 20/20 plus, O. S. 20/20.—From *Government Reports of Daniel W. White*.

Case No. 35. May 8, 1912. C. M. Female. Age 32 years. Illinois. Vision: O. D. 6/200, O. S. 2/200. Diagnosis: Cicatricial trachoma. Deep, clear nebulae.

Operated: Removal of tarsus and palpebral conjunctiva. This case had very frequent reactions and suffered all the time with bright light. She had given up all hope of saving the little sight she had. Treated everywhere; means unlimited. She is a banker's wife. Three weeks after the operation improvement started, and at present time patient has vision of 20/60 in each eye. No more reactions or discomfort. This cornea had also been devitalized from long astringent treatment, and will not regenerate like other corneas.

Case No. 36. August 14, 1914. N. D. Female. Age, 22 years. Married. Residence, Texas. Vision: O. D. 20/200, O. S. fingers at 10 feet. Diagnosis: Smooth cicatricial trachoma. Deep, smooth and clear nebulae.

Operated: Removal of tarsus and palpebral conjunctiva. This young woman had been told she was near-sighted; she had been refracted about six times, and had very strong lenses. This case is unusual in that vision improved much faster than I expected. At present date, O. D. 20/20, O. S. 20/10 plus. She gained 15 lbs. in weight and is a different woman. She had very little astringent treatment, and I believe this is the reason she is improving so fast, while other cases like this have stood still in a few instances, or made a very slow improvement.

Case No. 37. May 8, 1914. K. C. Male, age 18 years. Chief,

Texas. Vision: O. D. 20/200, O. S. 10/200. Diagnosis: Excessive beefsteak trachoma. Dense pannus and nebulae.

Operated: Removal of tarsus and palpebral conjunctiva. This patient did not work for one year prior to seeing us. Treated eyes for six years. Constant reactions. Vision, four months later, O. D. 20/40, O. S. 20/50.

Case No. 38. August 15, 1914. W. B. B. Male, age 22 years. Farmer. Residence, Texas. Vision: O. D. 20/100, O. S. 20/100. Diagnosis: Hard beefsteak trachoma. Pannus.

Treatment: Placed this man on astringent treatment. Before this, however, excess hypertrophy was removed by author's silica rasps (sand paper). He could not remain for the removal of tarsus. His vision gained 10 per cent under this treatment, but I feel those cicatricial lids will gradually in time destroy his vision. It may take years for this result. This has been my experience in those cases.

Case No. 39. March 9, 1910. P. I. T. Female, age 32 years. Married. Residence, Oklahoma. Vision: O. D. 20/200, O. S. fingers at 9 feet. Diagnosis: Old, smooth cicatricial trachoma. Pannus, nebulae, marked entropion of upper eye-lids. Trichiasis.

Operated: Removal of tarsus and conjunctiva. This case did not improve in her vision, due to the entropion which was still present. I had to perform two entropic operations before I secured much result. Six months later, when I examined vision, she had O. D. 20/60, O. S. 20/100. This means pressure must be removed in order to get results.

Case No. 40. September 6, 1913. G. M. Female, age 38 years. Married. Residence, Kansas. Vision: O. D. hand, O. S. L. P. Diagnosis: Old, smooth cicatricial trachoma. Old pannus (deep). Entropion upper and lower lids. Distichiasis. Rough cornea.

Operated: Removal of tarsus and palpebral conjunctiva, and correction of entropic condition. This case the lids presented marked deformity, and the palpebral conjunctiva was almost wanting. The operation did not correct the entropion. Vision in eight months' time was O. D. 20/50, O. S. fingers at 20 feet.

This summary was obtained from the authors' personal cases, from which he chose at random. The youngest case in which the author removed the tarsus and palpebral conjunctiva was four years of age. There has been no contraction or deformity of eye-lids, and the vision is normal, after a period of over four years. He is associating daily with trachomatous children, and has not become reinfected with trachoma. For some unexplained reason

the authors have had better visual results in males than in females, especially after the fortieth year of age. The result of the operation has been a success as far as vision is concerned, with but a few exceptions. In reviewing records we find three cases with no improvement after the operation. In two cases the vision decreased, 12% in one, and 5% in the other. The authors have not formed a positive reason for this. In two cases long astringent and surgical measures were used by other oculists for twenty years. I believe over-treatment was the cause of no visual increase. On the three other cases where vision remained the same, the authors are of the same belief of Casey A. Wood, maybe due to xerosis tendency of the conjunctiva and weak resistance of the patients' regenerative power. The authors report three cases of marked entropion after the operation. Those cases had entropion before the operation. This was easily corrected. There was one case of symblepharon found: cannot give any reason for this occurrence. One case of increased entropion which was easily corrected. There were two cases of increased ptosis. They believe this was due to excising the orbicularis fibers where they interlace with the canthal ligaments, and the misplacing of sutures, and not securing an even incision from the inner to the outer canthus in the ocular conjunctiva. This is one of the reasons the authors advise the use of wide fixation forceps. (See Fig. 2.) In no case have we produced ulcer of the cornea with our sutures, and do not know of any xeroses produced by this operation. We do not believe it necessary to clear up reactions before operating. No reinfections have been found, and we have only found two cases where any of the old reactions returned. One was due to new cilia, which subsided on correction: the other we could not determine, except it was from foreign irritation, or a new pus infection. We found staphylococci in this one. The photophobia symptoms returned at intervals in one case—no other reactions or relapses. The entropion has been corrected to such an extent in practically all cases to cause no further surgical procedure. This almost wholly depends on placing of sutures and the other technic the authors have used.

In recording the vision, the authors make a record of an average normal vision 20/20, or the patient reads the eighth line from the top of the test card at a distance of twenty feet. Computing from the first letter or line—20/200, 20/100, 20/70, 20/60, 20/50, 20/40, 20/30, 20/20, or normal from the first line to the eighth line respectively. This can be divided also into percentage. This explanation is made for the general practitioners who may have

forgotten the card vision test—the greater the denominator the less the vision.

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SOME CLINICAL STUDIES ON THE TRACHOMA QUESTION, WITH REFERENCE TO CONDITIONS IN SOUTHERN ILLINOIS, U. S. A.*

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The purposes of this paper are to present:

The conclusions reached concerning trachoma after eighteen months study of this disease in Southern Illinois where it is endemic; together with the climate, soil, seasons, habits and prevalent diseases in this part of the State.

Second: The results of a clinical investigation into certain striking parallels between trachoma and tuberculosis, in an endeavor to trace the relationship between these diseases so often associated in the same individual.

Third: The most satisfactory methods of treating trachoma in its various phases and its various complications.

The amount of matter written on Trachoma is quite extensive; conflicting theories are aired with great enthusiasm, much of repetition is found in the literature, and the further back into the ophthalmic records of the past one goes, the greater the confusion between trachoma and other chronic and acute inflammations of the eyes that is to be found. Possibly the earliest reference to trachoma is to be found in the *Papyrus Ebers*, written about a thousand years before Hippocrates, which contains a prescription for the "Blair-eye" which was likely prevalent in Egypt at the height of its civilization.

Hirschberg thinks that trachoma was known to ancient India and China, as well as to the early Greeks and Romans.

No climate seems to confer immunity, and no race seems exempt, although the Negro is less prone to the disease than any other race.

Trachoma does not appear to have become prevalent in Europe during the middle ages and not until after the Napoleonic campaign in Egypt, when it and other contagious ophthalmic diseases rendered whole districts blind from ophthalmia, thought to be a mixture of gono-blenorrhea, acute catarrhal conjunctivitis, and trachoma.

In America its origin has been variously attributed to the introduction of infected foreigners and to introduction during the colonial period, and possibly both these views are true.

* This article as here printed is the abridged portion of an exhaustive essay on Trachoma submitted by the author for his Doctorate Thesis.

ETIOLOGY.

The specific micro-organism of trachoma has not found general acceptance, although the "*Inclusion Bodies*" of v. Prowasek and the "*Free Initial Bodies*" of K. Lindner seem to be the theories having the brightest outlook, and in fact, seem to have disposed conclusively of all present opposition.

Undoubtedly trachoma is an infectious disease which depends upon the predisposing factors of lowered general or local resistance for its ability to develop the typical trachoma lesions.

Morax, Lindner and Ballak have found these inclusions and free initial bodies in the conjunctivæ of ophthalmia neonatorum non-gonorrhoeica and in the vaginæ of the mothers and the urethræ of the fathers.

This disease has been transferred to the eyes of monkeys and typical trachoma lesions developed containing the bodies in question.

The opponents to the claims of v. Prowasek and Lindner cite the finding of inclusions in *Epitheliosis Desquamativa*, *Vernal Catarrh* and *Swine Pest*, but it seems impossible to inoculate monkeys with the inclusions of these diseases and that these so-called inclusions do not produce trachoma lesions.

The present status would seem to be that the inclusions and free initial bodies are to be given respectful hearing before being summarily disposed of in the matter of the etiology of trachoma.

CONDITIONS IN SOUTHERN ILLINOIS.

A study of the soil conditions of Southern Illinois where trachoma is endemic reveals the fact that there is a large variety of soil from red and yellow clay, red and black loams, sandy soils, and the alluvial soils of the river and creek valleys. In many places the country is level for long distances, subject to inundation that would submerge the fence posts. Other parts are hilly with either abrupt sides or long slopes.

In the counties in which I have studied meteorologic conditions I find that the snows and rains of winter cause large tracts of land to be under water for various depths, while in summer during dry seasons the fine dust of the roads becomes a sort of impalpable powder which blows with every passing vehicle and fills the atmosphere with a haze.

The winters are of moderate severity, the temperature seldom falling to ten degrees below zero, and usually a thaw occurs after two or three weeks of freezing weather and this may be followed by a fog which requires several days to clear up.

This changeable condition of the winter renders the people more susceptible to catarrhal diseases of the nose, throat and ears, and the close rooms in which people are housed with a hot stove in the center with the entire family keeping warm by it, rapidly depletes the air of oxygen and lowers the general resistance of the body to infection; the common wash basin, common towel, closed and crowded sleeping quarters add their influence to that of bad air in spreading any infection, and trachoma thus is transmitted from one person to another.

In the summer time the fine dust which permeates the atmosphere near the highways produces an irritating effect on the conjunctivæ and increases the patient's susceptibility to eye infections.

The school rooms and the churches are notoriously ill-ventilated—this is true of the churches in the larger towns and small cities, in fact they are almost devoid of ventilation.

The vicious habit of poulticing the eyes with flax-seed, elm bark, potato, etc., for any pain in or near the eyes is still quite prevalent.

Tuberculosis is quite common in southern Illinois, and persons confined indoors are more susceptible to the "white plague" than those who spend the greater part of their time in the open air.

The prevalence of tuberculosis in this part of the state and the accidentally discovered fact that trachoma often improves under the influence of anti-tuberculous treatment led one of my preceptors in Chicago to regard the two diseases as being very closely allied, in fact he felt that the association might be in the nature of a common etiology and so treated such cases of trachoma as came under his care.

His results were of a flattering nature and this led me to locate in Southern Illinois in order to bring the study to where the disease is endemic and to learn as much of the nature of the relationship as a busy practice affords.

A study of the Reports of the U. S. Public Health Service reveals a striking parallelism between the percentage of American Indians suffering from the two diseases. In giving the tuberculin test to trachoma patients I noticed that they practically all responded with a positive reaction; that is to say, they manifested a chill, fever, malaise, local redness and swelling with induration. This reaction was noticed in cases which had not previously shown any symptoms of tuberculosis, and so was regarded as a striking association between the two diseases.

In all previous studies in tuberculosis I had noticed that the

tuberculin test produces also a focal reaction in all recognized tuberculous lesions, and I therefore gave particular attention to the trachomatous lesions to observe any effect in the way of a reaction. I am unable to report a single case in which any reaction took place in the lids of a patient suffering from trachoma and giving a positive reaction to tuberculin.

In the treatment of trachoma with tuberculin I have been able to observe some rather sudden remissions in the usual course of the disease and have seen others resist all tuberculin treatment as though nothing was being done for the case.

My more frequent and more prolonged contact with trachoma has led me to some conclusions which differ from those drawn by my distinguished friend and instructor in Chicago.

By having patients come regularly for observation each week I have been enabled to observe the effect of certain treatment on the disease and to compare results in one case with those of other methods used in other cases, and thus I have drawn certain conclusions as to the merits of tuberculin, grattage, copper and silver salts, dionin, etc., etc., and to do some work in the surgery of trachoma complications as in trichiasis, distachiasis, entropion, posterior synechia, ulceration of the cornea, and shrunken conjunctivæ.

Trachoma virus is known to be influenced but little by temperature, while dry fomites soon loses its virulence and moist fomites holds the infectious material active for a very long time. The intense humidity of the air near sea coasts and in low valleys is, therefore, better as a conductor of the disease than a dry atmosphere, and this is true in a measure of the tubercle bacillus.

We are therefore justified in incriminating the common towel in damp weather. (See *Boldt on Trachoma*, page 122.)

Von Arlt, von Michel, Raehlmann and other ophthalmologists of eminence regard scrofula as more closely associated with trachoma than any other disease. It cannot be accepted as the etiology but only as the agent best adapted to prepare the field for the trachoma virus.

While in Denver, Colorado, last winter I assisted Dr. Melville Black operate upon two cases of trachoma in the second stage, and saw a third case with him which was monocular in type. And I should add that some element of climate or other factor caused the lesions to have a much paler appearance than those with which I am accustomed in Southern Illinois, and it caused me to hesitate on the diagnosis for awhile.

None of these cases showed a positive reaction to tuberculin. This is, therefore, additional evidence that some other factor than tuberculosis is the direct cause of trachoma.

A French ophthalmologist reported in 1912 a series of 8 cases of trachoma in which he had used diphtheria antitoxin in 5 minim doses once a week for three weeks with a clearing of the lesions and no return within eight months. I therefore followed his method with some succulence of the lids after the first administration and less reaction after the second dose and no reaction after the third dose, and there being no improvement in the trachoma lesions after a month of "watchful expectancy," I discontinued the research in that direction. I had used this method in three eyes, in the second (extrusion) stage.

With the tuberculin I was much more fortunate in securing reactions both local and general, as mentioned above, but no focal reaction, which is the generally accepted manner in which tuberculous lesions are known to respond. I used the Lucius and Bruening preparation of Koch's Old Tuberculin, making fresh dilutions daily in .01, .001 and .0001 in 1/4% phenol solution. I followed the usual dosage in the arm till there seemed to be no reaction, then I began with weaker dilutions and injected it in the conjunctiva and only when I used it thus in the lids was there any reaction seen in them.

In some of the cases I used it in the arm in sufficient dosage to obtain a reaction of 1 degree of temperature but there appeared no reaction in the lids.

In a few cases there was perceptible improvement in the appearance of the trachoma lesions, but in these cases I was using a weak silver solution three times daily and this may have accounted for the improvement. In one case of the third stage there occurred a redness at times which lasted for three or four weeks with some pain and sensation of roughness which I gave 5 minims of .001 O. T. and the reaction was decided, but the eye lesion cleared up over night.

The fact that one person in eight in Illinois dies of tuberculosis may be sufficient to explain the universal reaction I have been observing in trachoma cases. And it would mean that trachoma attacks more tuberculous persons than non-tuberculous individuals.

Dr. W. R. Ross, who has been in practice in southern Illinois since 1880, told me that he had observed that a large percentage of trachoma subjects later died of tuberculosis.

I think that this is additional evidence not of identity of etiology

of the two diseases, but of the close association of the two in the same patient. This is further strengthened by the experimental work of K. Lindner of the Fuchs' Clinic (See *Graefe's Arch. f. Ophth. Bd.* lxxvi., II. 3). Lindner found that trachoma inclusions and free initial bodies produced in monkeys typical trachoma lesions and no other organisms.

In the guinea pig inoculations for more than 500 cases of demonstrable tuberculosis in testing the ill-fated Duket experiment in Chicago, Dr. June L. Edmondson found only typical tuberculous lesions at the post mortems on the pigs, while the transference of the inclusion bodies of v. Prowasek to the conjunctivæ of monkeys resulted in the production of typical trachoma lesions, and this was repeated when transferred from monkey to monkey. (See *Wolfgram: "Beitrag zur Trachomforschung."* *Klin. Monatsbl. f. Augenheilk.*, 1910, *Beilageheft*, und *Wolfgram: Ophthalmol. Gesellschaft zu Heidelberg*, 1910.)

PANNUS.

It has been my custom after operating for the removal of the granulations to use a five per cent Dionin ointment in the eyes once a week till the effect seemed to be slightly less than at first and then to double the strength of the ointment, which is as strong as I have found it necessary to administer for the relief of pannus and to relax the conjunctival sac.

This latter effect has given the patient the most happy relief of anything in the third stage except possibly the operation for entropion. The dionin produces a slight burning sensation for a few moments and is followed by a sensation of comfort which lasts for several hours. There is an edema of the conjunctiva produced which leaves the tissue relaxed and in this way the sac is stretched and the motion of the eye increased till the tugging of the globe on motion is no longer a handicap.

The dionin also relieves the pannus and within three months all my cases with pannus have become cleared of same and the vision in many cases has increased from perception of light to 20/200. I have not used jequirity in any of these cases on account of the satisfactory effects of dionin and also on account of the pain accompanying the use of jequirity.

By gradually increasing the strength of the dionin and not administering it too often, thus avoiding tolerance for the drug, a vast amount of good can be accomplished within a few months in restoring vision and in giving freedom of ocular motion.

ENTROPION.

The cicatricial contraction of the cul de sac is shared by all parts of the conjunctiva and to a great extent by the tarsal plates. The effect of this shrinkage is manifested by an incurving of the tarsus at its lowest edge and by an indrawing of the eye lashes till they are directed against the cornea and by their friction on the globe cause lachrymation, photophobia, redness, and ulceration of the cornea. The dionin treatment relaxes the conjunctival sac sufficiently in my hands, to obviate the necessity for canthotomy.

In operating on the lids for entropion I make an incision the full length of the tarsal plate and about 3 mm. above the line of the lashes and down to but not including the tarsal plate.

With blunt dissection I free the edge of the lid from the tarsus and when this is drawn up puts the conjunctival tissue on the stretch and turns the lashes directly upward, the upper lap of lid is dissected upwards to the upper border of the tarsus and with about six sutures the lower flap is drawn up towards the upper border of the tarsal plate till the line of lashes is perpendicular, the sutures are then bound to the brow with adhesive and kept in this position for five or six days when the sutures are removed and the newly formed relationship has become stable and the new direction of the lashes more firmly fixed. In some cases of distichiasis I have had to remove the inturning hair with the galvano-cautery but usually there has been a satisfactory result by the above described operation.

In the first cases I hesitated to loosen the edge of the tarsus from the lower flap on account of the discharge of the Meibomian glands but having treated one case in this manner with no bad after effect, I have cautiously repeated the technique in all other operations and have had no undesirable results although eight months have elapsed since the first operation.

I continue the use of dionin till all sense of discomfort is relieved and there has been an average of seven months since the discontinuance of this treatment and no complaints have come to my notice.

OPERATION FOR THE REMOVAL OF THE TRACHOMA FOLLICLES.

If the disease is in either the first or beginning of the second stage I use Carbon Dioxide Snow for 15 seconds the first application and after an interval of two weeks I repeat with a 30-second application lightly applied and the use of tepid boric solution to remove the chill so as not to influence the cornea.

I have been using this method only a short time and cannot report definitely as to permanent results.

If the case is in the second or beginning of the third I do a grattage of the lids in the following manner:

1. I cleanse the field of operation.
2. Instil a 4% cocaine solution.
3. After 5 minutes I instil a 10% solution of cocaine in the cul de sac and after an interval of 5 minutes.
4. I evert the lid with a forceps so as to roll the transitional folds of conjunctiva out for grattage.
5. With a trachoma rasp I remove the apices of the follicles and endeavor to open all granules so far as I can detect them, and follow with the application of a Knapp roller forceps with just sufficient force to express the contents of the follicles without lacerating the conjunctiva.
6. With a piece of gauze wrapped around my index finger I follow the forceps and render the surface smooth and with gauze dipped in a solution of 1/3000 bichloride of Mercury I thoroughly cleanse all parts of the conjunctival sac and then
7. Apply powdered boric acid to the conjunctival sac and replace the lid. The same operation is done for the lower lid, and I follow this with the daily use of the following prescription.

R Sulphate of Copper.....gm 10.
Glycerinegm 100

Misce et sig. Use one drop in ten drops of water and apply with dropper once a day.

This clears up the trachoma process quite satisfactorily within a few weeks. The longest time reported in any case of mine was two weeks.

Formerly I used cold applications to the eyes after operation, but after seeing Dr. Melville Black of Denver use hot fomentations for two hours after operating his cases with the result that they could open their eyes and had no swelling of the lids. I have used the heat with much more satisfaction than the cold and find that it leaves a much better subjective sensation with the patient.

I have used this routine in a child of 14 and in all older patients though I have met defeat when the same was attempted on a child of 10 years. He became frightened and a general anesthetic had to be resorted to in order to finish the operation.

ULCERATION OF THE CORNEA.

This is not an unusual complication in any stage of the disease in the earlier stages; it seems to result from friction of the

roughened lid and blepharospasm; in the later stages the extruding granules may cause an erosion of the corneal epithelium.

Treatment consists in removal of the cause. The granulations where they are the cause, the entropion operation where it is the friction of hairs that have caused the abrasion of the cornea.

This should be followed by some mild ointment as White's or the use of zinc oxide ointment and bandage.

In the central ulcers in old trachoma cases I have found the best results to follow the use of carefully applied tincture of iodine to the ulcer giving the patient a narcotic to render the pain tolerable if necessary. Most patients do not need the narcotic. After the infection is controlled by the iodine I have found White's ointment satisfactory with bandage till the eye has recovered and then operate to remove the cause of the ulcer.

TRICHIASIS AND ENTROPION.

Cases of entropion usually result in trichiasis. I have seen several cases of entropion with all the lashes lying in close contact with the cornea and producing a matted secretion which was very offensive to the observer. The fact that pannus was a complication in these cases is the only reason I can assign for the lack of discomfort.

I operated on four of such cases by the method outlined elsewhere with complete relief in all cases.

First I did the entropion operation and when it had healed I did the grattage of the lids, and after healing I began the vigorous use of Dionin, first in 5% ointment and after the establishment of tolerance the 10% ointment was substituted with a clearing of a large part of the pannus. I should add that all of these cases gave a positive reaction to tuberculin and that I gave them the O. T. once a week at the time I used the Dionin.

The entire course of treatment being less than six months in the longest and fourteen weeks in the shortest.

Pannus tenuis is more frequent in my practice than pannus crassus, and seems to arise in the cases when the extruding lymph follicles make friction on the globe.

The color is that of skimmed milk but is not opaque, but rather translucent, allowing a view of the iris beneath and causing blindness to the extent of dimming the outlines of small objects and rendering reading impossible or quite difficult.

The blood vessels may arise from all points of the periphery or they may arise from one or two principal branches at the canthi.

The blood vessels and the opacity itself may disappear in the

course of treatment as a result of the hyperæmia which acts on the principle of the Bier hyperæmia treatment. This can be hastened by the use of Dionin ointment in 5% strength once a week for ten or twelve weeks and the use of 10% per cent strength for an equal length of time. The blood vessels do not completely disappear but can be seen with indirect illumination under high magnification, but they give the patient very little inconvenience in seeing.

Pannus crassus differs from pannus tenuis in that it is very much thicker and causes greater changes in the corneal tissue. It has also a greater tendency to spread over the entire cornea. I have seen three cases in which it covered the entire cornea, giving it a dirty gray appearance and in which were distributed a varying number of blood vessel leashes and which with the removal of the granulations and the use of Dionin the condition cleared up enough to allow the patients to perform duties not before possible.

This form of pannus causes a greater irregularity in the cornea and its consequent loss of acuity in vision when recovery has taken place. The blood vessels and the irregularities have not wholly cleared up in my hands but have been reduced to an appreciable degree.

ILLUSTRATIVE CASES.

The following cases illustrate the principles and investigations in this paper. These cases have been studied for sufficient length of time to arrive at the practical value of some of the proposed treatments that were the cause of this investigation.

While the number is not large they have been carefully studied and the research work has enabled the writer to eliminate many border line cases; that is to say, cases of follicular conjunctivitis, eczematous conjunctivitis, vernal conjunctivitis, and the acute infections of the conjunctiva.

This was not always easy, for in the initial stage of trachoma the appearance is not unlike that of acute catarrhal conjunctivitis.

Eczematous ulcers of the cornea are also confused with atypical trachoma lesions. For the beginner who studies trachoma in all its phases there are many cases at first tentatively diagnosed trachoma which later developments will cause him to throw out, and what at first appeared confusing will clearly define itself as a typical trachoma on the one hand or as a typical case of a less formidable disease on the other.

CASE I.

John W. E. Age 13. Farmer. Trachoma in Third Stage.

The disease was contracted while serving as a soldier during the

war between the States in 1863. He was stationed at Memphis, Tenn., when the stage of invasion began. Pannus developed at the close of the war and he had only perception of light in the left eye for a period of 49 years. The right eye suffered much less than the left and only within the last ten years has ulceration begun in the right eye. The left eye has suffered from repeated ulceration for more than thirty years and there are now numerous large opacities in the left cornea, more especially in the lower half.

The pannus in the same eye rendered the iris and aqueous chamber invisible. The conjunctival shrinking had produced such decided posterior symblepharon that the eye was moved only through a small arc, the limitation being very disagreeable to the patient.

Vision was reduced to 10/200 in the right eye and patient states that he has not been able to read ordinary print for several years. There was a marked entropion of both upper lids and on account of the lashes touching the globes he had repeatedly removed the hair until the lids were bald.

This is a combination of conditions that is usually regarded as beyond reach except the entropion operation for the relief of the trichiasis. But I gave him at the time 5 min. of 1 10000 Old Tuberculin hypodermatically which produced a positive reaction, both local and systemic; at the same time I used 5% Dionin ointment in the conjunctival sacs. The dose of Old Tuberculin was gradually increased to 10 min. of 1/100 in eight months, and the dionin increased to 10%.

In order to induce him to continue the treatment of the pannus and symblepharon I removed the ingrowing hairs each week.

At the end of eight weeks treatment I presented him to the Franklin County Medical Society with the following improvement:

Vision: O. D. 20/65, O. S. fingers at three feet, with marked increase in the movements of the left eye.

Three months later I did the entropion operation on both upper lids under local anesthetic directing the eye lashes as nearly vertical as possible to elevate them. Resulting in complete freedom from the trichiasis.

The movement of the eyes is quite normal in extent without the former tugging of the conjunctiva.

CASE II.

Frank L. W. Age 49. Farmer. Has been suffering from "the sore eyes" for several years (impossible to obtain exact dates).

When first examined, Oct. 29, 1914, both eyes were losing in

acuity of vision, the right was less than 2/200 and the left had only perception of light.

The corneae were covered with pannus and old cicatrices resulting from ulcers several years previously.

The upper lids are in the cicatricial stage of trachoma, smooth and somewhat contracted, some slight inward turning but not causing friction by the lashes on the globes.

The right eye had been operated about a year previously in the upper nasal quadrant and an iridectomy done at that point for the purpose of securing a useful pupil. However the pannus had closed the opening to such an extent that he could not perform so common an act as using an axe.

He responded to the tuberculin test and was given treatment for this disease each week since and has grown very much stronger.

The local treatment of the eyes has consisted of the use of a weak silver solution three times a day and the use of a five per cent Dionin ointment once a week, with the following result:

The right eye has become free from the pannus and he has 20/200 vision, while the left has become useful in that he can see objects on his left side. He can do his farm duties with ease and read large print slowly.

CASE III.

H. J. B. Age 73. Old soldier. Trachoma of more than 50 years standing, lids in cicatricial stage, entropion of the upper lids, some corneal scarring, vision 10/200 in each eye.

Entropion operation performed July 18, 1914, on both upper lids, lashes grew out in nearly vertical direction and have not given any further trouble.

Local treatment to the eyes consisted of five per cent Dionin ointment once a week with rapid improvement in the vision and in the limitation on ocular movements due to the marked posterior symblepharon.

Patient removed from my observation without my obtaining a record of the vision.

CASE IV.

Matilda H. Age 71. Trachoma in the third stage, also has a daughter whose eyes are in the same condition and grandchildren suffering from the second stage, with photophobia and blepharospasm. Patient has a thin pannus over both eyes and a gradual loss of vision, being less than 10/200 in each eye. The shrinking of the conjunctiva has also become extreme.

Treatment consisted of tuberculin in graduated doses (after a

positive reaction), silver in weak dilution, and five per cent Dionin ointment once a week.

Results were quite satisfactory—the eyes became clearer and the conjunctival sac became very much more elastic.

Did an entropion operation on both upper lids but not satisfactory on account of distichiasis.

Wm H. Monocular trachoma. Figures A and C represent the appearance of his right eye and everted lid when he came to me for treatment on Oct. 17, 1914. This eye has never been involved. Figures B and D represent the left eye when I first saw the case. The dotted curve in Fig. B represents the amount of ptosis when first seen, and the everted lid (Fig. D) shows the involvement of the tarsal plate of left eye—the upper border of which was studded with granulations and numerous granulations were also found on the tarsus. The color was that of freshly cut beefsteak. It was thickened and succulent.

Figure E represents the present appearance of the left lid everted. The color has become normal except at the canthi where it looks somewhat succulent and more red than its fellow.

The tarsal plate has returned to the normal color with discrete conjunctival blood vessels and slight visibility of the Meibomian glands. And the lid is almost free from ptosis.

CASE V.

Mrs. Clara G. Age 36. Has had trachoma since childhood which is now in the third stage with marked entropion and tendency to ulcerate. A pannus tenuis on the left eye with a central ulcer of the cornea on the same eye were the lesions for which she sought relief when she called on me April 7, 1914.

The tuberculin test was positive. Therefore the routine tuberculin treatment was instituted and continued.

After healing the central ulcer of the cornea with the usual remedies the patient has used only five per cent Dionin ointment once a week with excellent results in the relief of the conjunctival shrinking which had occurred. At present she is ready for the entropion operation.

It would become tiresome to read reports of more cases of this character, it is therefore sufficient to say that in all these cases there has been marked relief in the symblepharon with the weekly use of five per cent Dionin, as well as in the recession of the pannus of both types, which improves the vision sometimes in a rather surprising manner.

The next cases will illustrate the character of treatment used in

the first and second stages of trachoma. This necessarily differs from the third stage on account of the granulations requiring proper treatment and the absence of trichiasis and symblepharon. In all these cases which gave a positive reaction to tuberculin the use of tuberculin was continued with relief in many cases, not of the eye symptoms, but in a general way of improvement of health, increase of appetite and weight, etc.

In these cases I used several modifications of the usual treatments. I tried dropping a minim of full strength tuberculin in the eyes, also under the conjunctiva.

Still in other cases I used more than 500 units of diphtheria antitoxin under the conjunctivae, which at first produced a reaction in the way of slight edema of the lids but after the second injection there was no more reaction and no apparent effect on the trachoma process.

CASE VI.

Miss Bertha B. Age 17. Eyes became inflamed while traveling by wagon from Hemenway, Mo., to Macedonia, Ill., during the second week in July, 1914. The road is described as being very dusty and the wind as blowing a great portion of the time. This is one of the classic conditions for the initial attack of trachoma, and it would serve as well to induce any other character of conjunctivitis.

Ten weeks after this infection was first noticed the patient was referred to me. Examination showed pulse, 130; temperature, 99.8; blood pressure, 110.

Eyes had a muco-purulent discharge, lids were beef steak red and swollen, while the globes were not greatly altered in color and did not appear to be involved in the process.

Tentative diagnosis: Trachoma. This opinion was reached on account of the fact that she had been under a physician's care during the previous ten weeks and the doctor had used boric acid, zinc, silver and copper at various times without producing the slightest change in the progress of the disease. This is rather pathognomonic of trachoma, and is so accepted by the active workers in the treatment of trachoma.

Treatment consisted of the hypodermic use of tuberculin in graduated doses and the local application of weak silver and White's ointment. By Nov. 23, 1914, the acute attack had abated and the patient could resume her usual occupation.

The feature which I am not able to explain is the disappearance of the follicles under the influence of the tuberculin.

For a period of 48 hours the symptoms seemed worse after the administration of the tuberculin and then a marked improvement would occur, the patient suffering less photophobia and sensation of a foreign body in the eyes than at time of treatment.

When I last saw the patient on Nov. 9, 1914, the folds of the upper conjunctiva were still thick but were slightly more injected than normal and the vertical vessels on the tarsus were again visible and all subjective symptoms were relieved.

CASE VII.

Miss Bertie H. Age 37. Saleswoman. Old trachoma referred by her family physician on account of an acute exacerbation of "granulated lids" in the left eye. Examination of the lids showed typical cicatrices of the third stage of trachoma and in the left eye a few enlarged follicles at the outer end of the tarsus of the upper lid. I gave her a weak silver solution for use three times a day and also a hypodermic dose of 10 min. of 1/1000 tuberculin. The reaction from the tuberculin was very decided, the arm was swollen to almost twice the normal size at the site of the injection, and the temperature rose to 103.4 and she remained in bed for 24 hours. The next day I examined the eye to find that the acute condition had completely disappeared. I gave her the same treatment once a week for three weeks with reaction in each instance and discontinued. The patient feels very much better than she has for several years and has had no further attack during the last eight months.

CASE VIII.

Mrs. Clarence H. Age 30. Right monocular trachoma. Eye lid shows a decided drooping. Granulations at the ends of the tarsal plates and a large amount of cicatricial tissue in the center of the tarsus. Lids everted and gentle grattage of both upper and lower granulations done followed with expressage and the application of bichloride of mercury 1/3000 solution and hot fomentations with 1% cupric sulphate t. i. d. with a complete clearing of the lids. This case had given a positive reaction to tuberculin.

CASE IX.

Miss Ella M. G. Age 14. Eyes have been granular for two years and had grown so painful that she was having extreme difficulty in attending her lessons in school. The granulations were pale gray in color and very hard when first seen. There was a thin pannus in each eye and the blood vessels were running over the upper half of each cornea.

I began the use of tuberculin in this case and kept it as the chief remedy for a period of eight months, she did not at any time show

negative to the tuberculin but the only improvement noticed in this case followed the use of a weak silver solution till the eyes were carefully operated in the manner described above as the routine treatment of the granulations and the result has been a very satisfactory return to the normal in both eyes.

CASE X.

Winfred H. Age 10. Left monocular type of trachoma, in the invasion stage with mucus membranes very thick and the follicles decidedly enlarged with a mulberry appearance at the ends of the tarsal plates. Tuberculin reaction positive, grattage followed with 1% Cupric sulphate solution with a rapid disappearance of all his symptoms.

These cases might be indefinitely multiplied but sufficient has been stated to indicate the results in the three stages of the disease and agents used in these cases.

The conclusions to which the experiments in this trachoma study have led me are as follows:

Tuberculin is of value in detecting latent tuberculosis and in treating same, but is of no direct value in trachoma.

Tuberculosis predisposes to trachoma. And should receive proper treatment at the same time the trachoma is treated.

The granulations should be removed with exactness and care and follow with the use of the 1% copper sulphate daily till all lesions disappear and repeat as often as is necessary to prevent auto inoculation of the disease.

Dionin will satisfactorily relax the shrunken conjunctival sac and will enable the patient to move the eyes with much more comfort, and will also assist very materially in the early absorption of pannus.

Ulcers are best treated by removal of the cause whether that be granulations or inverted lids, the former by grattage and the latter by entropion operation.

All complicating diseases should receive attention at the time the trachoma is being treated in order to hasten the restoration.

ACKNOWLEDGMENT.

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ice Report No. 143, and to many local physicians who have assisted me in furnishing unlimited clinical material for the research work I had undertaken in southern Illinois.

My thanks are also due to Dr. Oliver Tydings of Chicago, who first gave me the incentive to make this study of trachoma and who has given me reports on his own work in this line of investigation.

To the authorities quoted or otherwise referred to in the body of this paper I feel grateful for the light their labors in this field has thrown on the subject.

CARCINOMA OF THE CARUNCLE, WITH REPORT OF A CASE.

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The favored seats for malignant growth of the conjunctiva are the inner canthus, the region of the plica semilunaris, the limbus corneae, whose papillary structure (Nakagowa)¹ (Fuchs)², seems peculiarly to predispose it to malignancy, and the caruncula lacrymalis. The complex structure of the caruncle may account for its predisposition to malignancy. A brief survey of its histology, which is rarely presented with any degree of completeness in the texts on ophthalmology, may not be amiss. It is recognized in the 170 mm. embryo as a mound like elevation on the nasal and inner surface of the lower lid. This elevation gradually assumes a position near the nictitating membrane and here develops sebaceous glands with or without hair and occasionally a few Krause's glands (Ask)³. Virchow⁴ finds that it is already present in the 41 mm. embryo. It develops partly from cutaneous and partly from conjunctival tissue, hence bears the character of both these tissues and of the structures common to them. It is virtually an island of skin minus the stratum corneum, occupying the lacus lacrymalis and rising above the niveau of the surrounding mucous membrane. The surface unlike that of the conjunctiva, is somewhat granular, due to the delicate projecting hairs. Its apex has a many layered pavement epithelium with basal cylindrical cells, the majority of these being polygonal. Upon the descending surface the layers of epithelium are gradually reduced until at the base they assume the character of the typical conjunctival epithelium. A pale yellow pigment may be found in the basal cells. Migratory and mucous cells occur (Virchow)⁴ and in the new borne, goblet cells are numerous (Ask)⁵. The propria presents an irregular papillated surface, its upper layers are loose and rich in lymphoid and plasma cells and in blood supply. Fatty tissue is present in small lobules in its deeper layers, and striated muscle occurs as isolated fibres or as small bundles, derived from Horner's muscle (Virchow)⁴. Small glands which Enslin⁶ finds identical in all details with true tear glands and sweat glands of the character of the glands of Moll are found. The hair follicles relatively large and the sebaceous glands do not differ in anyway from those found in the true skin.

That this complicated structure in which the individual components of the cutaneous and conjunctival tissues are so mosaically

fitted together offers all the morphological and etiological prerequisites for tumor growth is strikingly evident.

Of the tumors of the caruncle the naevus, dermoid, fibroma, papilloma, angioma, lymphoma and adenoma and related growths are commonly regarded as benign and the sarcoma and carcinoma alone as malignant. Of the latter the sarcomas greatly predominate in point of occurrence, they are commonly pigmented and frequently arise from pigmented moles or naevae upon or about the caruncle. Reported cases of primary carcinomas of the caruncle are few. Cases arising from the limbus or plica with secondary involvement of the caruncle have been reported, but these lie outside of the scope of the present paper. Saemisch⁷ in his resume of the literature up to 1904 accepts as authentic the following five cases:

(1) Seitz⁸ in 1855 reported a case in a male aged 51 years. The tumor at first barely noticeable as a blackish red spot, increased rapidly in size without causing discomfort or pain. When first seen by Seitz it had attained the size of a bean, somewhat lobulated and extended from the inner canthus to the corneal margin. It was adherent to the underlying conjunctiva and the nasal portion of the upper lid.

Following its thorough removal there were three recurrences within eight months. The first as a pin head sized dark spot upon the inner surface of the lower lid. The second as a bean sized tumor between the upper lid and the bulbus and the third as a somewhat smaller growth upon the same site. Microscopically a large round celled pigmented carcinoma.

(2) *Guaita⁹, 1885, enucleated the left eye of a woman to relieve pain caused by the growth of a tumor upon it. When first noticed this tumor had the size of a hemp seed, situated upon the caruncle, then gradually increased in size and extended over the corneo-scleral margin to an extent to interfere with vision. This carcinoma had its starting point in a sebaceous gland of the caruncle.

(3) *Sgrosso¹⁰, 1889, removed a melanotic carcinoma from the caruncle of a woman aged 79 years. It had attained the size of a pea after three years standing.

(4) Mantey¹¹, 1896, described a tumor of the caruncle in a male aged 65. For three weeks he had noticed a small growth in the inner canthus of his eye, which had enlarged rapidly in size. When first seen by Mantey it measured 8-14 mm. and projected from between the lids. It involved the plica semilunaris and had

*Cases two and three quoted from Saemisch.

a small bridge of attachment with the conjunctiva bulbi, but was free from the conjunctiva of the lids. Microscopically it proved a carcinoma rich in cells. The cells were lodged in a delicate reticulum and involved the tissue as coiled strands. Their nuclei were large with distinct nucleoli. In type the growth was distinctly epithelial and bore a strong resemblance to a gland carcinoma, on the strength of which Mantey believes it to have arisen from Krauses' or from the sebaceous glands. Three months after removal no recurrence.

(5 de Schweinitz¹², 1898, male, aged 52. When first seen the growth had attained about the size of an ordinary pea, it sprang directly from the right caruncle, which it had practically replaced. It was of a reddish yellow color and had existed for a number of years, recently had grown slightly and caused some irritation. Microscopically it presented externally a covering of flattened epithelial cells directly succeeded by long tubules or plugs of spheroidal epithelial cells, agglutinated together, but not held in any capsule. Between these cells was a delicate stroma composed of fine spindle cells and collections of small round cells. In many of the plugs towards their centers were areas of degeneration which in their later stages closely resembled "concentric globules" or "birdnest bodies." These areas represented collections of dead epithelial cells. There were no blood vessels to be seen among the cell groups. de Schweinitz did not think this growth typically epitheliomatous or carcinomatous, but held it to belong to the class of endotheliomas, in which the cells resemble epithelial cells and are grouped into masses and separated by a frame work or stroma and in which also nests or globules may be found. After removal a recurrence was not noted.

A search of the references and literature antedating 1904 has disclosed no additional case to add to the above five quoted by Saemisch⁷, excepting the following questionable one:

Despagnet¹³ in 1888 described a melanotic new growth of the caruncle under the term of "Epithelioma melanique." This, after 18 months growth, had attained about the size of a pea and was adherent to the caruncle by a pedicle. The pathological examination made by Lattaux revealed that this melanotic epithelioma developed from three distinct sources, the surface epithelium of the caruncle, the epithelium of the sebaceous glands and from that of the hair follicles. Mantey¹¹, Blum¹⁴ and Saemisch⁷ dispute the authenticity of this classification and believe it to be a melanosarcoma: Aurand¹⁵ accepts it as an epithelioma.

Two further cases reported respectively by Petit¹⁶ and Aurand¹⁷ complete the list of published cases of carcinoma of the caruncle so far as a careful survey of the literature reveals.

Petit's case, a woman of 82 years of age, presented a tumor of the caruncle about the size of a pea, with an irregular surface and not pedunculated. This was removed with scissors, after two years no recurrence. Under low magnification the surface epithelium appeared greatly thickened and took a deeper stain. In its depths were seen rounded "globules" resembling epithelial pearls. The epithelium was arranged in concentric layers not unlike an onion bulb. The underlying connective tissue projected into the epithelial layer as long filiform papillae, in some places these were quite regular suggesting a benign tumor,—a papilloma. In places the epithelium penetrated into the underlying tissue as irregular masses within which were the epithelial pearls. Under high magnification the epithelium appeared flat and stratified, all cells appeared living and stained well. Cornification or karyokinesis were not noted. The connective tissue was infiltrated with embryonic masses. Diagnosis: Flat celled epithelioma with formations analogous to epithelial pearls.

Aurand removed from the left caruncle of his patient a small black tumor 2x3 mm. A recurrence was not noted. His patient showed several pigmented moles on his face and lids. Under low magnification the corneum and deeper tissues showed an infiltration with irregularly disseminated melanotic cells, in places these formed a distinct stratum in contact with the deeper Malpighian layer. In one place they appeared as a well limited oval blackish mass, surrounded by a thin fibrous capsule divided by strands of tissue, in its center were blood vessels and hairs whose sheaths appeared to be invaded by these melanotic cells. Under high magnification the cells were disseminated without definite order. In places they appeared as plaques or nests or large deeply pigmented cells, polyhedral in outline, with an invisible nucleus, and resembling epithelial cells. Some cells were smaller with less pigment, and a visible nucleus. An actual invasion of the hair sheaths and glands by the cells was not demonstrable although such a tendency was apparent, consequently the point of origin of the tumor was not in these structures, but very probably in the deep layers of the Malpighian epithelium, from the pigment cells normally present in this layer. Diagnosis melanotic epithelioma arising from the Malpighian cells. A tumor which until recently was designated as an alveolar melanotic sarcoma, because of its tend-

ency to divide into compartments, into nests and into plaques. Added significance is attached by Aurand to his diagnosis on the basis of heredity, the mother of the patient having died of cancer of the uterus.

Petit's case leaves no doubt as to the correctness of the diagnosis. Aurand's description prompts in the mind of the writer the probability of a misinterpretation. It is true that certain alveolar sarcomata can be distinguished from carcinomata only with great difficulty. In Aurand's case those very characteristics common to sarcomas are most prevalent. The predominance of cells over intercellular substance and virtual absence of a fibrinous stroma. Its great richness in chromatophores, the irregularity of and the polygonal type of the pigmented cells. The large packed cells masses (plaques of Aurand). The absence of any systematic arrangement of cells as distinct from that common in carcinomata. The epithelium more or less sharply marked off from the underlying layer of pigmented cells. The close relationship of the cells to the surrounding tissue and in places the alveolar structure. The presence of disseminated moles on the face and eye lids of the patient, all suggest an alveolar melanotic sarcoma, rather than a carcinoma. Aurand fails to state why and on what grounds he chooses to discard this classification. The question of heredity in this case seems nugatory.

Including then Petit's patient in the group accepted by Saemish (Seitz, Guaita, Scrosso, Mantey and de Schweinitz) as authentic, we have but six recorded cases of undoubted primary carcinoma of the caruncle.

To these reported cases I can add the following one which is singular and unique in that both caruncles were the seats of a neoplasm. In this respect I have not been able to find its parallel in the literature. Fuchs² (p. 215) reports a case of epithelioma, which developed simultaneously and quite independently in both eyes at the inner margin of the cornea.

My patient, a man aged 56, carpet weaver, consulted me regarding a growth on his right eye. He first noticed a little redness and experienced an itching in the inner corner of his right eye about a year previous. Four weeks before I saw him he had consulted a physician because he then first noticed a growth on his eye which was rapidly increasing in size and caused an incessant tearing. He had never experienced any pain. When I first saw him, the caruncle of his right eye was practically replaced by a tumor mass which measured approximately 6x7 mm. (Plate-1.) It was partially





PLATE - II.

adherent to the conjunctiva of the lower lid and involved a goodly portion of the plica semilunaris. The lid borders in direct approximation were excoriated and slightly everted. Upon closure of the lids the tumor protruded between them. It was rather firm to the touch and of a brownish red color. It did not appear to be very vascular. The caruncle of the left eye (Plate-1) was slightly enlarged and appeared as a small, smooth surfaced, glistening knob, rather firm and of a bright red color. The adjoining structures were not involved. It had never given any discomfort, in fact the patient was not aware that it presented anything unusual. Both tumors were removed under cocaine. In the right eye the excoriated lid borders were cut away with a pair of scissors. The wound was cauterized, the conjunctiva from the bulbus planted over the defect and sutured, the cut edges of the lid borders were permitted to granulate over. In the left eye the seat of the tumor was cauterized and the conjunctiva sutured over this. The tissue removed was fixed in formalin and alcohol, sectioned and stained with haematoxylin and eosin. The pathological examination made in the pathological laboratory of the University of Wisconsin by Dr. Bunting gave the following picture: The section of the caruncle of the right eye (Plate 2, low magnification) shows the presence of an invasive tumor growth in connection with the conjunctival epithelium at one point. The tumor in the main is made up of relatively large, plump, solidly filled alveoli with more slender peripheral invading cell masses. The cells are relatively small, polymorphous in shape, with spindle cells predominating. They are closely packed and without "prickles," here and there in the large alveoli is found a tendency to cell nest formation with some keratinization. Mitotic figures are present in the tumor cells, but are not found in numbers. The tissue about the alveoli is infiltrated with lymphocytes and plasma cells, and shows a slight proliferation of connective tissue cells. Diagnosis: Basal celled epithelioma (Krompecher) or hair sheath carcinoma (Mallory). Mallory is inclined to derive these tumors from the cells of the hair sheath, which is not improbable.

This type of tumor is often multiple, does not metastasize, but has the tendency to invade. The section of the caruncle of the left eye (Plate 3, high magnification) presented the following microscopical picture. An unbroken conjunctival epithelium lying over a subconjunctival membrane thickly infiltrated with leukocytes. This membrane contains numerous hair shafts, sebaceous glands and a few tubular glands, lined by cylindrical epithelial cells show-

ing numerous goblet cells among them. Lying below the hair follicle is a group of glandular alveoli of various sizes and without any arrangement, typical of a normal gland. These alveoli have a lumen, as a rule and a lining of a single row of deeply eosin staining cells. The cells show a typical feature in the great variation in the size of the cell body and of the nucleus. The nuclei also vary much in intensity of staining reaction. Some cells merit the designation "Giant cells." In places the basement membrane of the alveoli has been invaded by the cells and they have extended into the intervening tissue in solid cords. The stroma of the nodule is infiltrated with lymphocytes and plasma cells. Diagnosis: Beginning cancer of sweat glands. Up to the present time a year later, a recurrence has not been noted in either eye.

In general the etiology of these tumors must be sought in that covering all epitheliomatous growth. The complexity of structure of the caruncle, as already stated, no doubt is a predisposing factor. Trauma appears to play an important role in the epibulbar forms. Saemisch⁷ has collected a series of cases of epibulbar carcinomata in which the growth followed immediately upon trauma, as injury from a branch of a tree or chip of wood, striking the eye, the switch of a cows tail, etc. My patient's occupation, that of weaver, exposed his eyes to constant minor insults, he had almost daily to remove small particles of fibre shreds or hair from his eyes, these frequently "worked in" and caused much irritation, because they were difficult to remove.

In all the reported cases where the age was given it exceeded the fourth decade. As regards treatment, thorough surgical intervention is without doubt the safest and best. The defect resulting from removal of the caruncle is scarcely noticeable and should not stand in the way of its radical removal. Injections of sublimate have been tried with negative results. Where contiguous tissue is involved the X-ray or radium might be tried.

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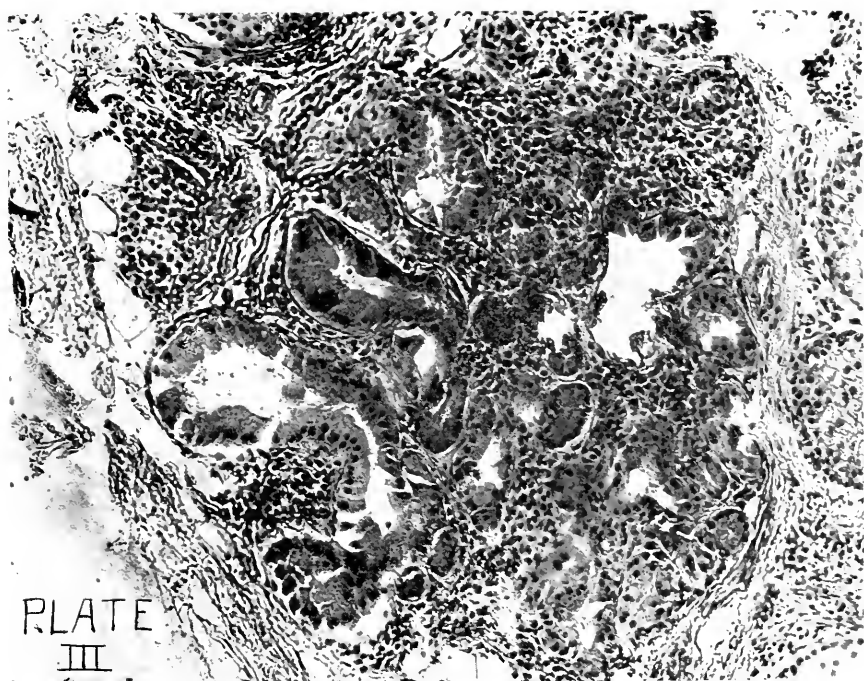


PLATE
III

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LOCAL ANAESTHESIA IN SURGERY OF THE IRIS AND LENS.

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The title of this paper comprises:

1. A method to apply an anaesthetizing solution directly to the iris.
2. A method of performing iridectomies without bleeding.
3. A method that will dilate the pupil, ad maximum *after* the anterior chamber has been drained.
4. An aid in removing the lens with or without its capsule, previous to, or after iridectomy.

According to the method followed in the extraction of a cataract, or during an iridectomy, there are three things to contend with that are always annoying when present to any marked degree, they are:

- A. Pupillary contraction.
- B. Pain.
- C. Bleeding.

PUPILLARY CONTRACTION.

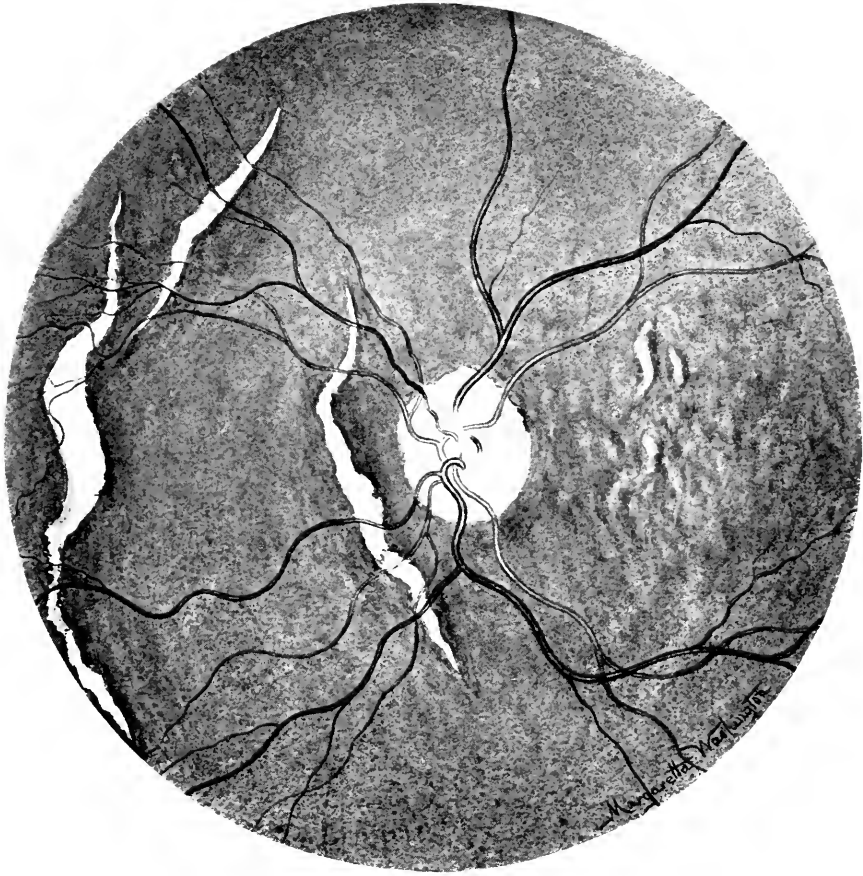
During a cataract extraction or when a simple iridectomy is performed, the very first thing that takes place after the cornea has been incised, is of course the escape of the aqueous humor accompanied by the collapse of the anterior chamber, and a contraction of the pupil. If atropine has been used before the operation and the pupil is thoroughly dilated, the pupil will nevertheless contract to a considerable extent as soon as the anterior chamber is drained.

This is no disadvantage during the performance of simple iridectomies, but during cataract extractions in their capsule or extra capsular without iridectomy, this pupillary contraction is an added hindrance to the proper extraction of the lens.

PAIN.

The question of pain is of the greatest consequence in any operation involving the opening of the anterior chamber, the performance of iridectomies, and the extraction of the lens. A patient that feels no pain, will in all probability be a quiet patient, and a quiet patient is a great desideratum towards a successful operation.

With my technic, which I will presently describe, a painless and



Local Anesthesia in Surgery of the Iris and Lens.
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bloodless iridectomy as well as a painless lens extraction with or without its capsule, can always be performed.

BLEEDING.

Bleeding will take place from two sources:

- A. The conjunctival vessels.
- B. The vessels of the iris.

Both of these are very annoying and may considerably hinder the technic of an otherwise successful operation.

The bleeding from the conjunctival vessels is avoided as we all know, by using one or two drops of the 1-2000 solution of Adrenaline, about five minutes before operating, at the time the cocaine solution is instilled, also by avoiding such an incision as will intersect the schlero-corneal margin at any point, as such an incision is not necessary for iridectomies nor cataract extractions. The bleeding from the iris vessels is entirely avoided following the technic I advocate.

Broadly speaking, the object of the procedure which I follow, is to avoid and to eliminate three conditions which I have mentioned, that is to say:

- 1. Pupillary contraction.
- 2. Pain.
- 3. Bleeding.

All of these conditions can be and are eliminated by following the presented technic.

TECHNIC.

The only special instrument that is necessary, is a small flattened canula with a rubber bulb such as is used in an ordinary dropper, with the tip curved in such a manner that it may be readily introduced in the anterior chamber.

If such an instrument is not available, an ordinary fine-pointed eye dropper will answer the purpose just as well.

I have been using for some time Dr. Fisher's irrigating anterior chamber canula, to which I have added a section of rubber-tubing, a glass tube and rubber bulb, with the view of rendering it flexible towards the tip and to allow one to gauge the amount of fluid taken in or given out.

The lids are washed with soap and water principally the free border; one or two drops of a one per cent solution of atropine is instilled on the eye and a 1-5000 bichloride solution wet dressing is applied to the eye. All this is done the night previous and the dressing is left over night till the moment of operation. If desired, the lids and both sides of the face are re-washed at time of

operation, then wiped with a very weak iodine solution or bichloride and a very generous douching of the conjunctival sack above and below is given with a normal saline solution or weak boracic acid solution. Two or three drops of a 2% solution of cocaine at intervals of about one minute for two or three applications is all that is necessary, for a very thorough anaesthesia of the conjunctiva and cornea in an eye that is not inflamed. I do not believe a stronger solution is necessary and it might be harmful to the corneal epithelium.

Before beginning the irrigation of the conjunctiva and also a minute or two before operating, one or two drops of adrenaline solution is instilled on the eye. So much then for the anaesthesia of the conjunctiva and cornea as well as the avoidance of bleeding from conjunctival vessels at any time during the operation, which is undoubtedly accomplished by such a well known method.

Before operation a solution is prepared by mixing one part 1-2000 adrenaline solution with two parts of a 2% solution of cocaine.

After the cornea has been incised, and the anterior chamber drained, the flat pointed canul is lightly inserted into the anterior chamber and two or three drops of this cocaine and adrenaline mixture are injected into the anterior chamber.

It is all important to wait about five minutes by the watch before proceeding with the operation. During this time, the lid retractor may be removed.

At the expiration of this time it will be observed that the pupil is considerably enlarged. Another application may be made before proceeding.

If an iridectomy is performed, it will be found that the iris is absolutely painless and furthermore that no matter what kind of iridectomy is performed, there will be no bleeding whatsoever. Furthermore, the deeper structures of the eye, such as the ciliary region, is also anaesthetized to the extent that I have performed iridectomies and cataract extractions in hypersensitive patients without their being aware that anything special was being done to their eyes.

In case you wish to perform a simple extraction without iridectomy the advantage of this technic is particularly apparent, because the passage of the lens through an undilated pupil in an iris that has not been anaesthetized is always felt by the patient either as pain or as a sensation of something pulling, and in any event, the patient will in all probability try to avoid the unpleasant

sensation by a spasm of the orbicularis or a motion of the head, or both combined, any of which is apt to have serious consequences.

By observing this technic the procedure is found to be absolutely painless and also that due to the extreme dilatation of the pupil the lens can over-ride the pupillary margin with far greater ease than otherwise as the spasm of the sphincter is avoided and the extraction is accomplished with little or no bruising of the body or the iris.

The technic is identical in the event of a cataract extraction with the lens intact within its capsule, with or without iridectomy.

I claim then as decided advantages for this procedure:

1. A perfect haemostasis from all sources principally the iris thereby ensuring a clear operative field at all times during surgical procedures of the eye.

2. A perfect anaesthesia of the iris.

3. An extreme dilatation of the pupil after the anterior chamber has been drained, which together with an insensible iris will greatly facilitate the removal of the lens either within or without its capsule.

I claim all these to be decided advantages as will be evident to anyone with experience in ocular surgery. I believe also that this is a step forward towards perfecting the technic of eye surgery.

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COMPLETE LEFT LATERAL HEMIANOPSIA WITH
GLYCOSURIA AS A RESULT OF
SLIGHT TRAUMA.

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It is the combination of a complete hemianopsia without sensory or motor symptoms, combined with a transient glycosuria, that gives the case its especial interest.

Mr. J., aet. 66, who was referred to me by Dr. L. C. Stocking, his family physician, gave the following history:

While walking on the street in the latter part of August, 1914, he slipped and temporarily lost his balance. By a strong muscular action he regained his equilibrium. When he reached his office, which was only a very short distance away, he sat down to make out some papers, which he did with difficulty. Very shortly he had occasion to cross the room, and in so doing stumbled over some one who was on his left side. This followed almost immediately after reaching his office.

Examination of the patient showed a well-preserved man with normal heart and lung action, with blood pressure 150. Excretory and secretory organs were apparently functioning normally. Normal gait and posture, except slight inclination to turn the head to the left. Reflexes normal, appetite and sleep also as usual, no deviation of the tongue on protrusion, cheeks inflated normally, equal strength on both sides of the body. There was some hardening of the arteries. No motor nor sensory disturbances were discovered.

Report from Dr. Stocking, who had examined the urine a few days prior to this time, showed normal urine, no albumen, no sugar, no casts. Two or three tests had been made in the weeks immediately preceding this injury and showed a complete absence of sugar and albumen. Examination a few days later showed large quantities of sugar, which persisted for a time, but in lessened quantity. The quantity of the urine was not noticeably increased. Blood pressure remains at 150. Sugar entirely disappeared about two months later and has not since reappeared.

Acuity right and left eye 20/12, promptly, no ametropia. Presbyopia was corrected by +3.00 diopter lens. Muscle balance, pupillary reflexes and fundus absolutely normal, except for some angio sclerotic changes. Fields, both right and left, showed left

lateral hemianopsia complete for both form and color, with retention of the central field of about ten degrees. No central color scotoma, the right sides of the fields were normal. There was no hemiplegia, no anesthesia, no aphasia.

By a hemianopsia I have reference to the loss of all perception of light in that half of the field. In this case there was retention of the central vision corresponding with the fields supplied by the maculo-papillary bundle of fibers.

Differentiation should be made in the use of the terms glycosuria and diabetes. Glycosuria, meaning the presence of sugar in the urine, either temporarily or permanently, due to some exciting cause. This may be due to some functional or organic disturbance. This condition should not be confused with diabetes mellitus. In many of the cases reported the terms have been used, apparently interchangeably. In this case the glycosuria was temporary.

I wish to state briefly the course of the optic nerve fibers in order that we may have a better idea of the possibilities in this case. The optic radiations starting in the region of the cuneus, passing back and then forward to the optic thalamus and then from the pulvinar to the corpora quadrigemina and forward in the optic tract to the chiasm, where a partial decussation takes place. The fibers from the right side of the brain, supplying the right side of the right eye, also the right side of the left eye, which parts are concerned in the left half of the visual field. A similar condition, of course, obtains regarding the fibers from the left side of the brain.

1. Diabetes is one of the oldest known diseases, being referred to by the Roman Celsus and the Greek Aretaeus, both of whom lived in the first century of the Christian era; also by the early East Indian physicians as a condition characterized by copious secretion of urine, extreme thirst, and emaciation. Little, if anything, was, however, added to the subject until the latter part of the seventeenth century, when Thomas Willis (1622-75) in England, first inferred from its sweet taste the presence of sugar in the urine. Moreover, it was not until another century later, 1775, that Matthew Dobson, also an Englishman, actually obtained sugar from urine.

Inseparably associated with the subject is Claude Bernard, who first discovered that glycosuria could be produced by puncturing the floor of the fourth ventricle. Since that time there is perhaps no subject in medicine to which has been contributed so much

knowledge from an experimental side as this very one, and yet no subject as to the true pathology and etiology of which we possess proportionately less accurate information.

2. Loomis states that it is a well-established fact that mechanical irritation of a certain area of the medulla, an area corresponding very closely with the vaso-motor area in the fourth ventricle, invariably produces glycosuria, and clinical facts prove with a great degree of certainty that diabetes (glycosuria) is frequently the result of lesions producing similar irritations. Such irritations may result from general shock, concussion, cerebral hemorrhage, softening, cirrhosis, abscess or tumors, also from excessive mental labor, shock, grief and possibly from the excessive use of cerebral stimulants.

3. Garrod states that some varieties of glycosuria do not call for any treatment such as the transitory excretion of sugar in cases of cerebral hemorrhage. Church and Peterson state that hemianopsia is frequently present immediately after the stroke, but usually passes away in a few days with the other sensory disturbances. When the visual path at the sensory crossway is injured hemianopsia persists.

4. Hemianopsia is the result of: (1) disease of the optic nerve and chiasm; (2) lesion of the fibers that proceed from the basal ganglia to the cortical visual area; (3) lesion of the cortical visual area.

Homonymous hemianopsia presenting the Wernicke (inactive pupil) symptom and accompanied by evidence of a lesion of the tractus or anterior principal optic ganglia.

In hemianopsia in a lesion cerebral from the chiasm the dividing line is sharply cut, except perhaps at the fixation point; here the retina is supplied by neurons whose fibers are connected with both cortical centers.

The deviation of the dividing line begins as a rule about ten degrees above and below the point of fixation and extends about five degrees into the amblyopic half. The dividing line may be exactly vertical, it may be somewhat oblique or it may extend around the periphery of the seeing half for a short distance above or below. These peculiarities are explained by supposing an irregularity in the decussation of the centripetal fibers.

The development of hemianopsia dependent on disease affecting the optic nerves, chiasm, tracts and primary visual ganglia is slow, as a rule, and is unattended by symptoms other than those of basal

cerebral disease. If due to tumor or cyst posterior to the basal ganglia, the development may be slow, encroaching on the visual fields gradually. In the greater number of cases due to lesion posterior to the basal ganglia the onset is sudden and the hemianopsia is complete, the lesion being due to hemorrhage, embolism or thrombosis of the vessels supplying this portion of the brain.

It is well recognized that persistent glycosuria or even grave diabetes may follow disease or injury of the central nervous system or even a severe psychic shock, but we do not know how large or how small a part may be played by the pituitary gland, in this connection.

5. Anders and Jameson report an interesting relation of glycosuria to pituitary disease and give a report of cases, with statistics. Robin reports a case of temporary glycosuria following cerebral concussion, sugar lasting four days. Lancereaux says that glycosuria following traumatism is much less serious than other varieties. It is temporary, it may disappear in a few days and it never continues longer than a few months.

6. Glycosuria or a true diabetes may occur in organic lesions of the brain without Bernard's diabetic center being necessarily involved. Glycosuria is not infrequent after cerebral hemorrhage. It rarely appears earlier than two hours after the apoplexy and usually clears up within six days.

7. Landois and Stirling state that a continued stimulation of peripheral nerves may act reflexly upon the center or the vaso-motor nerves of the liver. Diabetes (glycosuria) has been observed to occur after stimulation of the central end of the vagus and also after stimulation of the central end of the depressor nerve. Even section and subsequent stimulation of the central end of the sciatic nerve causes diabetes (glycosuria?). This may explain the occurrence of diabetes (glycosuria?) in people who suffer from sciatica. It may also occur after perverted nervous activity, as psychical excitement, neuralgia (sciatica, trigeminal, or occipital), concussion of the brain, as well as after certain injuries to the skull and vertebral column and some cerebral diseases. It is commonly admitted that the experimental glycosuria is caused by a centrifugal stimulus from the nervous centers to the liver, either through the vaso-motor system or direct stimulus to the liver cell.

8. Glycosuria has been known to originate in nasal obstructions and to disappear when this was removed.

9. Higgins and Ogden report the results of examination of

212 head injuries and conclude: (1) That after injury sugar may appear in the urine as early as six hours and disappear within twenty-four hours. The average time for its appearance, however, being from eight to twelve hours, for the disappearance of the same from the fifth to the ninth day. (2) That a small portion of the cases may exhibit permanent glycosuria from the date of injury to the head.

Pozzo refers in particular to the transient glycosuria liable to accompany infectious processes. Becker found it present in two or three per cent of several thousand cases of phlegmons, erysipelas, etc., and others have noted it in various acute infectious diseases as well as with surgical affections and under the influence of certain poisons.

Dr. Weil quotes the following from Prof. Carl von Noorden, one of the greatest authorities in the world on diabetes and glycosuria:

A large number of lesions have been discovered, both in man and in animals, each capable of causing glycosuria, referable to the disbursement of glycogen.

Among others are the following: Destruction of the superior and inferior cervical sympathetic ganglia and other sympathetic nerves of the first dorsal ganglion of the abdominal sympathetic; stimulation of the central end of the cut vagus nerve; painful stimulation of the peripheral nerves; psychic disturbances; injury to various parts of the cerebral hemispheres, the mid-brain and cerebellum. "(See Weil's paper for notes of 14 cases of diabetes caused by falls or blows.)"

F. M. Allen, in his recent exhaustive book on Glycosuria and Diabetes, writes: "No one doubts the frequency of transitory glycosuria following trauma of the central nervous system, or that the nervous disturbance is the cause of the glycosuria."

Fletcher also says that organic lesions of the brain, such as cerebral hemorrhage, may cause glycosuria; that it rarely appears earlier than two hours after the apoplexy, and generally clears up within six days.

"So great has been the influence of Claude Bernard's discovery on the views of the profession upon such matters that it has been assumed that most of the cases in which cerebral lesions, such as hemorrhages, tumors and meningitis, have been followed or accompanied by glycosuria. This has been due to an implication of the glycosuric center. In some instances there has been evidence of such extension, but in many cases there is none, and it

is uncertain whether a persistent glycosuria is ever attributable to a lesion of the glycosuric center."

Halstead's opinion is that shock, particularly concussion of the cerebrospinal axis, is the principle etiologic factor in traumatic glycosuria.

10. Therefore, while we must admit that the nervous system has something to do with the production of diabetes, sometimes directly and in other instances indirectly, we are not able to trace a nervous lesion in every case. It is further likely that the sympathetic nerve is an important channel for nervous influences, regulating as it does the opening and closing of the blood vessels.

11. Diabetes (glycosuria?) sometimes causes amblyopia and it is characterized by a central color scotoma. Central scotoma for white may also be present. The visual field may be normal or contracted, or may be hemianopic. The prognosis is unfavorable, although useful vision may long be retained.

As a result of, or associated with diabetes insipidus, a number of writers have reported hemianopsia, epileptoid attacks, optic neuritis, and symptoms of cerebral tumor; but it is probable, as Knies has suggested, that in these cases the polyuria was only an incidental effect of a lesion in the floor of the fourth ventricle, which was the real cause of the symptoms referred to.

12. Apart from the cataract of diabetic patients and those retinal and optic nerve lesions that so closely resemble the fundus changes, found in Bright's disease, there is sometimes observed a dimness of vision that simulates the amblyopia from tobacco and alcohol. There are in these cases no alterations visible with the mirror, but central scotomata for red and green can always be mapped out.

The diagnosis is somewhat difficult when the diabetic patient is a smoker, but in such instances the color defect often extends to blue and white. In time white becomes involved at the periphery of the field also, a condition of things never found in pure tobacco and alcohol amblyopia.

13. In addition to the affections of vision already described in connection with diabetes (cataract, retinal hemorrhages, etc.), there occurs an amblyopia. In this disease, in which the visual field is sometimes intact, sometimes peripherally restricted, occasionally hemianopsic, but in which there is a color scotoma and, moreover, in cases not addicted to the use of tobacco or alcohol.

14. We must not, however, forget to mention that concentric

narrowing of the field of vision is said to be one of the symptoms of arterio sclerosis of the vessels of the brain.

15. Howard F. Hansell reported in 1901 the case of a patient who had suffered for years with diabetes, who showed irregular hemianopic fields with detached scotomata. There was present also an atrophy of the optic nerves, reporting failing vision for six years.

16. Lawford describes the complications in diabetes to be the failure of accommodation, mydriasis, increase of refraction, paralysis of ocular muscles, keratitis, iritis, iridocyclitis, cataract, retinitis and diseases of the optic nerve, but does not mention the possibility of a hemianopsia.

17. Optic nerve disease has been described by Leber under these headings: (1) Amblyopia without ophthalmoscopic changes, with or without limitations of the field. (2) Atrophy. (3) Hemianopsia. He believes in the few cases of hemianopsia reported the defective vision was not due to the glycosuria, but to the localized intracranial disease.

Galezowski reports the case of a man, 58 years old, with myopia of 5 D., who had suffered for two years with right homonymous hemianopsia that had suddenly appeared. He sought advice on account of a diabetic keratitis. He was inclined to refer also the keratitis to a central disturbance.

18. Wilbrand reports a diabetic with hemianopsia with scotomata, who a few weeks later had an apoplectic attack with paralysis, showing atheromatous vessels.

19. Herschel reports a case in which after an apoplectic attack a bilateral nasal hemianopsia appeared which was limited by a vertical line passing through the point of fixation.

In hemianopsia due to hemorrhage or to thrombosis partial or complete recovery of vision may be expected, in a small percentage of cases. If recovery is to take place it begins almost without exception before the end of the sixth week. Hemianopsia due to a lesion of the optic radiation is only in extremely rare cases an isolated symptom. Its associated manifestations may be few or comparatively many. It may, for instance, be part of a symptom complex which includes word blindness, mind blindness and word deafness, with other symptoms so often combined with these forms or sensory aphasiae. If the lesion is deeply placed so as to implicate the posterior portions of the posterior half of the internal capsule, hemianaesthesia may be present, as may also impairment

or loss of the muscular sense and stereognostic perception. When hemiparesis occurs with hemianopsia which can be referred to the optic radiations the lesion is usually an extensive one.

The foregoing are some of the associations by means of which one is enabled with some approach to certainty to conclude that the lesion causing the hemianopsia is sub-cortical. Hemianopsias, cortical or largely so, are usually distinguished by the absence of such symptoms as hemianaesthesia and the various symptoms classed under the general head of visual and auditory aphasia, but if both cortex and sub-cortex are involved, the associated clinical phenomena will depend upon the depth and the extent of the lesion.

Hansell also says that hemianopsia, optic nerve atrophy and amblyopia are probably but indications of the three stages of one affection: namely, retrobulbar neuritis, terminating in atrophy.

Schmidt Rimpler says: "If the retrobulbar neuritis be so extensive that it has caused symmetrical loss of a whole half of the field of vision it usually progresses farther and does not suddenly cease. At the same time, after disappearance of the inflammation, a more or less extensive white discoloration of the papilla begins: This occurs very late, or not at all, in cases of intracranial hemianopsia."

At the present time, nine months later, there has been a slight change in the hemianopsia, the light perception has begun to return in the left side in the upper quadrant. The sugar has entirely disappeared.

Bernheimer has proven that the crossed optic fibers occupy mainly the lower part of the chiasm, whereas the non-crossed fibers are restricted to the upper half and form a closed bundle. The relation remains the same in the adjoining part of the optic tract: the non-crossed fibers occupy the upper, the crossed ones the lower part.

A lesion confined to the cuneus or to the gray matter immediately surrounding it on the mesial surface of the occipital lobes produces homonymous lateral hemianopsia without motor or sensory symptoms, at least without these as a direct consequence of the lesion.

If the lesion produced a hemiplegia, hemianaesthesia, the trouble would probably encroach upon the posterior portion of the internal capsule.

If the preserved fields are accompanied by concentric contraction, the smaller half field will be in the eye opposite to the lesion. Con-

traction of the preserved half field is most common with lesions of the cortex, but also may occur in lesions of the tractus.

If the hemianopsia is relative, the lesion must be in the cortex; elsewhere it produces absolute hemianopsia, but cortical lesions are not excluded by absolute hemianopsia.

A lesion producing typical hemiplegia, aphasia (if the right side is paralyzed), little or no anaesthesia and lateral hemianopsia, is probably due to disease in the area supplied by the middle cerebral artery.

A lesion causing hemianaesthesia, ataxic movements of one-half the body, no distinct hemiplegia and lateral hemianopsia could be situated in the posterior lateral part of the optic thalamus.

A lesion causing the symptoms of disease of the base of the brain, associated at the same time with changes of the pupil, changes in the nerve head and lateral hemianopsia, could be situated in one optic tract or in the primary optic centers on one side.

In this case we have the complete lateral hemianopsia, with the presence of sugar in the urine as a complication resulting from what seemed an apparently trivial incident. Guided by the suggestions as laid down by Sequin and because of the fact that this patient had a complete hemianopsia, that he did not have a hemiparesis or hemiplegia hemianaesthesia nor any of the aphasias, leads me to place the site of this lesion, cerebral hemorrhage, not sub-cortical nor encroaching upon the internal capsule, but in the gray matter of the cuneus itself. The glycosuria is but an expression of the severity of the shock.

The angio-sclerosis acted as a contributing cause and the slip as the exciting cause of the hemorrhage.

The question may arise as to whether the slight slip and the effort to regain his equilibrium caused the hemorrhage or the hemorrhage caused the slip. There was no dizziness or discomfort complained of at the time of the accident.

It is the combination of a complete hemianopsia without sensory or motor symptoms, combined with a transient glycosuria, that gives the case its especial interest.

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TRIPLE RUPTURE OF THE CHORIOID, WITH IRIDODIALYSIS.*

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(Illustrated)

This patient, C. B., I present through the courtesy of Dr. T. B. Holloway, in whose service, at the Polyclinic Hospital, he was seen. He presented himself on September 3rd, with a history of having been struck in the left eye with a baseball two days previously. The anterior chamber was about half full of blood, through which the upper portion of an iridodialysis could be seen dimly in the lower inner quadrant, but no details could be made out in the deeper structures. There was ecchymosis of the conjunctiva, especially in the lower outer quadrant. But little pain was complained of, although there was some pressure-soreness. Vision: R. 6/9, L. 1/60.

He was given atropine solution and a boric acid wash.

Two days later the hemorrhage had been absorbed except a small amount at the lower angle of the iris-tear, which was then seen to be about 5 mm. in length. With the ophthalmoscope a good red reflex was seen through the coloboma and the pupil. The vitreous was very hazy on account of large opacities, probably due to hemorrhages. The disc and blood vessels could be located, but the details were not seen.

Absorption and clearing of the opacities progressed favorably under the use of dionin and heat, in addition to the atropine.

An examination, made 16 days after he was first seen, showed large floating vitreous opacities, but the general view of the fundus was clearer. The retinal veins were full, especially the inferior temporal. Two long vertical ruptures of the chorioid were seen, one irregular, beginning above the level of the center of the disc about one-half a disc's diameter to the nasal side and curving downwards, with the concavity towards the disc, nearly to the lower pole of the eye—this tear was narrow, about two or three times the width of a retinal vein; the other was seen, concentric with the disc, about two and a half disc's diameter to the nasal side in the mid-zone, more irregular in outline and in its widest part about four times the width of the first.

One week later the vitreous opacity had still further absorbed

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and a third long, narrow rupture was observed, beginning also on the nasal side of the disc, about two discs' diameters from it and apparently 2 to 3 mm. to the temporal side of the upper extremity of the first tear described, and curving upwards and towards the temporal side. Vision, 6/30.

After the vitreous opacities had still further cleared, several irregularly shaped erosions were seen between the disc and macula. There was evidence of some disturbance in the macula, and his vision when last taken was one letter of 6/21.

While single indirect rupture of the chorioid is by no means an uncommon occurrence and double rupture is at times recorded, triple rupture is relatively rare. Of 289 cases of chorioidal rupture investigated by Polenz and Ohm, quoted by Kröner, 70% were single, 16% double, 10% radial, but no mention is made of triple rupture.

Of this latter type, I find a case reported by Lewis¹, one each by Wittmer², Hird³, Black⁴, Kroner⁵, and Sweet⁶.

Chorioidal rupture is most frequently crescent-shaped and situated on the temporal side of the disc and concentric with it. Variations are common, however. It may be horizontal, as in cases reported by Uribe y Troncoso⁷, Heed⁸, Todd⁹, and others. It may be triangular, as in a case reported by Krauss¹⁰, or V-shaped, as reported by De Schweinitz, also Y-shaped, and of other irregular outlines.

In view, therefore, of the infrequency of triple rupture, of its position in this case to the nasal side of the disc, and of its being complicated with iridodialysis, I have deemed it of sufficient interest to bring it before the Section.

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IS MIGRAINE A FORERUNNER OF GLAUCOMA?

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In discussing this question the first essential is an understanding as to the definition of migraine and the definition of glaucoma. Migraine, or hemierania, is a violent boring pain, situated over the eye, in the forehead, and above it, and sometimes also in the eye itself. I might add to this, that the pain is often continued over the back of the head, down the neck and into the shoulder of the same side. The attack is usually preceded by a disturbance of vision, scintillating scotoma. During the attack the patient feels best if he can lie quietly in a darkened room; glaring light increases the pain and there is marked photophobia. After the onset of the headache the intensity usually increases, lasting from part of a day to two or three days, and is accompanied by nausea and sometimes vomiting, after which the patient feels better and the attack comes to an end. The tendency is for the attack to come at intervals, sometimes once a month, or at even more frequent intervals. It usually occurs in persons of a highly nervous organization. Almost invariably the attack follows a persistent and continuous use of the eyes, that causes considerable strain. These periodic attacks may begin early in life and continue for twenty years or more.

Let us look for a moment at the definition by Mr. Priestly Smith of glaucoma, which has probably been studied more thoroughly by him than by any one else: "Glaucoma is a complex morbid process, depending essentially upon an excess of pressure in the chambers of the eye."

So far as we know it was not until 1830 that William McKenzie discovered increased pressure in the eye, called attention to it and made some attempt to relieve the pressure. It was not, however, until twenty-five years later that von Graefe, after thoroughly studying the subject, brought out his famous iridectomy for glaucoma. For years there has been a general understanding that there is a so-called prodromal period in glaucoma antedating the final attack.

Perhaps it was the indefiniteness of the literature in regard to the prodromal period of glaucoma, together with the very great difference of opinion as to its etiology, which set me to thinking. Another reason for my interest in this subject was the discussion

with glaucoma patients (that is, patients who came to me for the first time with an acute glaucoma which necessitated an immediate operation) of their previous history. In the discussion of their symptoms I found a number who gave a history of migraine headache including scintillating scotoma, but who were treated by the family physician for biliousness. One case I recall; the patient was operated upon for gall bladder trouble, the supposition on the part of the physician being that the trouble was undoubtedly of a bilious nature.

As a matter of fact a compilation of the histories including the previous treatment of patients for neuralgia or migraine would be highly edifying, and except for the wofulness of inaccurate diagnosis and loss to the patient incident thereto, would be somewhat amusing.

When one's attention is first attracted to the question of migraine as a forerunner of glaucoma, there may not at first appear to be any relationship between them, yet one feels that in view of the possibility of saving patients a loss of vision, time, worry and expense, resulting from acute inflammatory glaucoma, any measure which will modify in a beneficial way or alleviate the condition or perhaps even prevent it, must of necessity be given serious consideration. As the etiology is obscure we still are bound to attempt an early recognition and diagnosis of the prodromes of glaucoma. It is a well-known fact that this scintillating scotoma occasionally occurs in migraine, yet migraine occurs without scintillating scotoma; this has been recognized, I believe, for years.

Having become interested in the possibility of migraine being a forerunner of glaucoma, I began taking the tension by palpitation in cases coming either to the office or to my clinics. Occasionally the tension was $T+1$ and sometimes only slightly $T+$. In order that there might be more accuracy about the matter I determined thereafter to take the tension of both eyes in all cases presenting the history of recurring attacks of unilateral headache with or without scintillating scotoma. In all my cases I found the tension up a few points, sometimes markedly so. Occasionally the tension was up in one eye only, the eye on the same side as the unilateral headache. More often the tension was up in both eyes and in some cases I found that where the tension was up in both eyes the headache had a tendency to become general, although it began on one side; and occasionally cases occurred in which the tension of the eye on the side opposite the one having usually the

unilateral headache was higher than the tension of the eye on the side with the headache.

Invariably in these cases I found that later on the tendency was for the headache to shift, alternately, or at least occasionally, from one side to the other. I can only account for this in that the astigmatism was at on off axis in these cases in the eye on the side of the headache, whereas the good eye was more apt to have the astigmatism with the rule. The usual tension in these cases I found to vary from T. 22 mg. or 23 mg. to 35 mg. or 40 mg. in some few cases. The average, therefore, was in the neighborhood of 28 mg. In other words, there was an increase which was so slight as to be considered normal for some persons. On the other hand, when we consider those patients whose vision becomes normal after trephining, with a tension of 13 mg. or 15 mg., we realize that the normal tension has to be considered somewhat as we do blood pressure, i. e., according to body weight and the habit of the individual, that is, whether plethoric or not.

I want to call attention to a point in connection with these cases which seems to me significant. I have yet to examine a patient whose migraine headache was associated with intense photophobia, that I did not find chorio-retinitis, especially in the central region of each eye, and the exudation or destruction much more marked on the side where the unilateral headache had occurred. Realizing as I do that I am likely to incur criticism by the following statement, I still beg to offer it to you as my conclusion, after very arduous, painstaking investigation of these cases. It is that, in cases in which error of refraction, chiefly astigmatic, more often of the hyperopic character, though not necessarily, is an exciting factor; upon a general run-down system, fatigue, overwork, and a highly nervous organization, bad hygienic conditions such as faulty illumination, there is chorio-retinitis more or less severe, and a sufficient disturbance of circulation to produce an imbalance between the inflowing blood and lymph and the drainage from the eye. It is a well-known fact that the migraine headaches almost invariably follow intense effort in which the eyes as well as the brain play a part. It is not so well understood that shocks of all sorts bring on exacerbations of migraine headache in the same way in which acute inflammatory glaucoma is brought on; sudden shock, such as the death of a member of the family, near and dear to the individual, or some accident followed by anxiety and worry; even

the mere sight of an accident by the individual may precipitate an attack.

Let us look for a moment at several points of similarity between migraine and glaucoma. First, the fact that both are inclined to occur in families, as in the case of parent and child, and among those whose physical characteristics are similar, such as the color and general appearance of the eyes; and to carry the point farther, I have analyzed the refractive error in certain families and found that in some instances the amount as well as the kind of refractive error were the same. In many other instances they were similar in kind if not exactly alike in amount. To carry the point beyond this I may say that in one family in particular the symptoms have been similar in six boys out of seven (the family is one of eleven boys, seven of whom I have examined). The seventh had myopia in one eye, with mixed astigmatism in the other; all the other boys had hyperopic astigmatism.

Another point of similarity is the fact that in my observation gouty subjects are more inclined to migraine and to glaucoma than are other persons. One of our French confreres has stated that migraine and gout are sisters. I am sure we all remember the great stress laid upon gout as a cause of glaucoma. For years it has been a matter of belief, and great attention has been directed toward the correction of gastro-intestinal conditions in migraine and in glaucoma.

In regard to the field of vision I may say that I have nothing accurate to offer as to the similarity of changes in the field, and this perhaps is the greatest objection to my proposition that migraine is a forerunner of glaucoma. I ask you, however, to consider two points, one that there is at least in each case a disturbance of the retinal elements, the one, as I take it, transient in migraine, the other a little more permanent as in prodromal glaucoma, which seems to me to show the probability of the first being in the irritative stage, the second in the stage of beginning degeneration. I have tried to get the fields roughly. I have not attempted to get the fields accurately in view of the great difficulty of obtaining any correct information from patients suffering with migraine, especially in those patients in whom there is scintillating scotoma or photophobia to a marked degree.

Some of our French writers who have studied the subject of migraine go so far as to record the presence of changes in the iris. This has been denied by other observers. Piorry many years ago

precipitated a discussion which lasted over a number of years by insisting that overstrain of the iris and overstrain of the retina were responsible for migraine. His theory has, however, never been accepted.

I am going to record the fact that on close observation of cases of migraine I have been able to ascertain on which side the pain was in the habit of occurring by observing that the pupil of that side was more dilated and the anterior chamber was shallow as compared with that of the other eye. There was also a slight difference in the color of the iris, i. e., in the clearness of the color, and in addition, what is more significant, it seems to me, a definite though slight ciliary congestion, the difference brought out under the Zeiss Loupe.

Time will not permit me to go as thoroughly into the various reasons that I have for my belief as I could wish and I must content myself with asking you to see the following picture of migrainous eye as I have seen it. I think many of the symptoms would easily explain my position—First, the tendency to from one to two millimeters of exophthalmos as measured by the Hertel instrument. Second, the slightly dilated pupil with the slightly shallow anterior chamber, slight ciliary congestion, increase of tension, pain radiating to back of neck and shoulder, nausea, sometimes vomiting and scintillating scotoma. On ophthalmoscopic examination chorioretinitis is more marked in the migrainous eye, usually more marked in the central region, which would account for the sudden blindness or obscuration of vision occurring in these attacks, also for the photophobia. All this complex is relieved by one or two drops of eserine salicylate or sulphate, one-half grain to the ounce solution. It has been a well known fact that migraine has been relieved by pilocarpine, either as a diaphoretic or by local use alone, just as cases of prodromal glaucoma for many years have been controlled by myotic treatment.

It was about five years ago that I began taking interest in this subject. My case records run into the hundreds and it would require a separate paper to tabulate them for the various case symptoms and treatment before drawing any conclusion. If you will bear with me for a little while I would like to cite a few cases showing typical migraine and indicate their treatment as outlined and the results obtained. I will try to do this as briefly as possible. I select a few cases, neither the worst, nor the mildest. (I remember one of my cases in which the disease had lasted for over twenty-five years.) Another fact which may be of interest is that

some of my cases have been to as many as six or seven oculists; had glasses refitted on many occasions without relief. In many of the cases I made no attempt to change glasses, in order that I might prove to the patients that the trouble never had been so much a matter of glasses as a condition of the eyeball, which had been overlooked.

The first case I wish to refer to is that of A. L. H., married, architect, age 41; came to me September 5, 1911; had had pain in his eyes, head and neck whenever using his eyes for work for any length of time. The trouble dated back twenty years. This patient's astigmatism was only $+0.25$, at 80° in the right and 100° in the left, together with a little hyperopia, greater in the left eye. For four years this patient had gone to bed about once a month for a period of three or four days with typical symptoms of migraine including the vomiting, and when he came to me he said the attacks had become more frequent and he wanted to know if his eyes had anything to do with them. I fitted him with glasses, under hyoscine and homatropine, treated him at home with a mixture of pilocarpine 1 grain, dionine 20 grains to the ounce of water, to be used one drop in each eye three times a day, together with mercurial friction to the temples, 10%, at bedtime, and syrup of hydriodic acid internally. These medicines were given because of the increased tension of the left eye and chorio-retinitis. He was kept under observation one or two months and then once a month until December 4, 1913, when the tension was found to be 15 mg. in the left eye, which was the migrainous eye. He has not been seen in the office since November 30, 1914, but I have an intimate acquaintanceship with him and meet him from time to time. Whenever he is conscious of the slightest strain of the eyes from overwork he uses his drops, takes one-half or one hour's rest and goes ahead with his work. There was no disease of an organic nature, the man's health was practically perfect, he leads an active, industrious, sober life, and always has done so. He is of a highly sensitive nature, yet shows no morbidity.

The second case is Mrs. S. W. McC., aged 38, married, had had dizziness and blind spells over one-half the field, and biliousness for ten years. Came to me November 1, 1910, wearing a spherical $+1.75$ prescribed by one of our leading oculists. I found that the best glass to give her was $+0.75$ with $+0.50$ ex 180 in each eye. I got in this case a history of menorrhagia. There was mild chorio-retinitis, and in view of the fact that she lived in the country, and her general practitioner had been unable to control the

hemorrhagic tendency, I did two things; first tried to stop the overabundant flow with fluid extract of hydrastis, 30-drop doses, in the beginning every three hours, later three times a day and then twice, and finally once a day; the other was to better the blood condition and try to offset the nervous waste by a mixture of red bone marrow and lecithol, together with the pilocarpine, dionine and mercurial friction. *Vide Supra*. I have seen her occasionally, about every three or four months ever since. The patient was about as nervous as any patient I have ever seen; she was also in a very much run down physical condition, with a slight esophoria for distance and exophoria for near. Her tension was slightly up in each eye. Since I have undertaken her case she has lost her father, and yet she has never had any severe attack. I may say that at the end of six weeks after beginning treatment she rode horseback in a show and took the jumps.

The third case, W. W. E., age 41, married, railroad superintendent, attacks extending over a period of twenty years. Came to me July 10, 1913; had good vision for distance, complete history of migraine, worse on left side. Hertel Exophthalmometer O. D. 24, O. S. 25, intertemporal 114, hyoscine and homatropine refraction; patient was given for distance, right eye -0.25 sph. with a $+0.25$ cax 90° , left eye -0.50 , sph.; added -0.50 for near glasses. Tension 22, right eye, 28 left. Have seen this patient at intervals of four months or more ever since. He was put upon the same mixture of pilocarpine and dionine with mercurial friction; internally was given Donovan's Solution. He had marked chorio-retinitis in each eye, worse in the left, and blepharitis marginalis in each, worse in the left eye.

The fourth case, E. M. D., age 23, unmarried, came to me February 1, 1913, wearing $+3$ cax 120° O. D. and -3 cax 60° , O. S., slight exophthalmos in the left, tension up in the left; hyoscine, homatropine examination, and prescription given her for $+2.25$ cax 105° $+3.50$ cax 75° ; she was put on pilocarpine, dionine and mercurial friction and syrup of hydriodic acid. She was quite well from June, 1913, until March, 1915, when because of the death of her grandfather she had another attack. This, however, responded to a few treatments, in the office, with eserine and dionine powder together with the resumption of home treatment. She had had this trouble for more than twelve years.

The next case is of interest from two points; first, he is a physician, second, he is a myope. V. D., age 33, married, came to me November 11, 1911. Had worn glasses for twenty-two years, pre-

scribed by several of the very best oculists in the country: had been for eighteen months in the care of an excellent oculist, who had been giving him prism exercises and a prism to be worn in his prescription glasses. Had had almost constant attacks for the last six or eight months. Tension up in each eye, chorio-retinitis in each, worse in the left, slight exophthalmos in the left. For distance there was no imbalance, there was an exophoria of six for near. Had been wearing -0.62 with -0.88 c.ax 85° O. D., -1.50 combined with -0.50 c.ax 85° O. S. For near I gave him a -0.88 c.ax 85° O. D., $-0.88 = -0.50$ c.ax 85° O. S. He was given pilocarpine, dionine and mercurial friction: nothing internally. I thought he could take care of his own physical condition, which was quite good. He still keeps on hand his drops and whenever there is a slight suggestion of an ache he uses them. Only three or four times within the four years have I had occasion to supplement his treatment by any local treatment in the office. Whether justly or not, he has condemned the oculist who had him using prism exercises at home and in the oculist's office for a period of eighteen months, without any relief, but with increasing discomfort. However, I may say he has been a staunch supporter of mine since the day when he first received relief from the headaches which were materially interfering with his work.

This pain radiating into the shoulder has been common to these cases. I may say here that in each of my cases where this symptom complex has been found I have prescribed for distance colored glasses, Hallauer 64, and in some cases 67, some cases only 63 or 62, and in a few I have prescribed two pairs of Hallauer together with a plain pair for indoors. The deeper shade for outdoors, the medium shade for ordinary lights on dull days and the plain glasses for indoors when the electric lights were not turned on. My idea in this was of course to protect the retina against the disintegrating effect of light until the pigment layer became normal.

I believe that I have given enough cases to illustrate some of the points of similarity between the migrainous eye and the prodromal stage of glaucoma. I have not given any of the histories of the cases in which I found it necessary to operate for glaucoma and which originally attracted my attention to the possibility of migraine being a forerunner of glaucoma. Time does not permit of any further discussion of the subject and perhaps I have already occupied a good deal of the time of the meeting.

I believe I have ample proof to uphold my position and I bring the subject before you for criticism and for whatever information

there may be contained in my paper, for your co-operation in working out the truth or fallacy of the proposition. For myself I may say that after five years work, with the relative cure in all cases, and absolute cure in a few, for those painful migraine headaches, I am convinced. There are so many angles from which this subject has been viewed, including in some cases the relationship of the migraine headache to other conditions of the general system, such as thyroid hypersecretion, deficient adrenalin chloride secretion and blood pressure, and so forth; and there has been no time to bring these matters before you, yet I assure you that they have been given due consideration in connection with the subject. I wish to express my thanks for the opportunity to come before you with this matter and finally to hope that it may lead to the alleviation of a great deal of suffering, anxiety and apprehension on the part of our patients, and redound to the credit of oculists everywhere.

COLOR TESTING.
GEORGE HENRY TAYLOR,

RAILWAY MEDICAL OFFICER NEW SOUTH WALES GOVERNMENT RAIL-
WAYS AND TRAMWAYS, SYDNEY, N. S. W., AUSTRALIA.

A survey of 1,000 consecutive candidates for employment in the Railway Service of New South Wales:

- 523 (52.3%) passed Holmgren's wool test and improved Williams' lantern test without mistake and were not further examined.
- 79 (7.9%) made the mistake of calling green—blue or purple in the lantern test. No other mistake.
- 54 (5.4%) made mistakes between purple and blue in lantern test. No other mistake.
- 29 (2.9%) called a dull white with a faint trace of yellow—red in lantern test. No other mistake.
- 20 (2.0%) called a dull white with a faint trace of yellow—purple in lantern test. No other mistake.
- 16 (1.6%) called red—green once in lantern test, but made no other mistake. They were all normal by Stilling and the wools.
- 15 (1.5%) called green—red once in lantern test, but made no mistake in wools or in Stilling.
- 3 (0.3%) called light red in contrast with a darker red—white once in lantern test, but were otherwise correct and passed Stilling's plates correctly.
- 1 (0.1%) was unable to see a dark red in the lantern test owing to defective vision.
- 9 (0.9%) made mistakes in wool test, but were correct in lantern test and passed Stilling's plates satisfactorily and were passed. Three of them picked blues in pink test and four looked at blues in the same test.
- 2 (0.2%) failed in lantern test, calling red—green or green—red, passed wool test and failed in Stilling's plates.
- 86 (8.6%) called No. 12 (light green) in lantern—white once only. No other mistake.

Of these 86:

43 (4.3%) read the whole of Stilling's plates correctly.

39 (3.9%) read Stilling's plates correctly with the exception of plate 9 in which they were partially correct.

4 (0.4%) failed in Stilling's plates.

32 (3.2%) called a dull white with a faint trace of yellow—green once only in lantern test, and made no other mistake.

Of these,

11 (1.1%) read the whole of Stilling's plates correctly.

15 (1.5%) read Stilling's plates correctly with the exception of plate 9 in which they were partially correct.

None of these failed in Stilling's plates.

19 (1.9%) called green—white several times in lantern test, and made no other mistake.

Of these,

32 (3.2%) read the whole of Stilling's plates correctly.

46 (4.6%) read Stilling's plates correctly with the exception of plate 9 in which they were partially correct.

7 (0.7%) failed in Stilling's plates.

20 (2.0%) called green—white, and white—green several times in lantern test, and made no other mistake.

Of these,

2 (0.2%) read the whole of Stilling's plates correctly.

9 (0.9%) read Stilling's plates correctly with the exception of plate 9 in which they were partially correct.

9 (0.9%) failed in Stilling's plates.

2 (0.2%) called green—white, and white—green in lantern test repeatedly and, although given a second opportunity, could not correct their mistakes. One of them read the whole of Stilling's plates correctly, and the other read them correctly with the exception of plate 9 in which he was partially correct.

11 (1.1%) were found to be Red-blind by Holmgren's wools, and failed in lantern and in Stilling's plates.

- 1 (0.1%) was found to be Green-blind by Holmgren's wools, and failed in lantern and in Stilling's plates.
- 12 (1.2%) were found to be incomplete color blinds by Holmgren's wools, and failed in lantern and in Stilling's plates.

1,000

The numbers rejected for employment were:

- 17 (1.7%) Red-blinds.
- 1 (0.1%) Green-blinds.
- 12 (1.2%) Color blinds, incomplete.
- 24 (2.4%) Failed in lantern test, not detected by Holmgren's wools. 22 of these failed in Stilling's plates.
- 54 (5.4%)

I use Holmgren's wools as they are still retained with the lantern as the official test in this State, but I always use Stilling's plates when I am in doubt, as I now place no practical value on the finding by the wools when they are in conflict with the lantern and Stilling.

It is not only necessary that a color tester should himself be color normal and have a mind trained by experience as a color tester, but that he should also be a stable person and remain mentally undisturbed and critical during an examination. A standard when fixed should be rigidly observed so that the private opinion of any examiner should not be in evidence.

The lantern alone does not enable an examiner to arrive at a positive opinion as to a candidate's reliability in color recognition. Stilling's plates, in my opinion, is a necessary adjunct and safeguard to the lantern.

If a person is defective in color, his defect may be more easily detected when his sight deteriorates. This has been admitted to me in conversation by men who were formerly engine drivers and had been removed from the running lines because of defective color sense. They stated that with a failing sense of vision there was an increasing difficulty in distinguishing red from green. A color blind engine driver frequently is a stable and intelligent man, and it is probable that such a man, recognizing the necessity of constant care in the recognition of colored lights, is guided by perceptions more alert than in the case of a color normal person. A defect in color sense, therefore, in such a person may tend to

stability as a worker. Inquiry amongst the firemen who had been associated with such color blind engine drivers made it clear to me that a color normal fireman often recognized the defective color sense of such an engine driver because of the frequency of his appeal to determine signal lights which to the color normal man were obvious. "How are the sticks, mate?" and "mate" became critical, although he never gave his driver away at headquarters. This condition of comradeship amongst the wages men of a railway service should be recognized in order to estimate the value of evidence in appeal cases.

A candidate who makes no mistakes in the lantern in the naming of red, white or green, and who is normal by Stilling's plates, is a person who may be employed on the running lines from a color sense standard without any reasonable doubt of his safe working. One mistake in naming green red or vice versa, not repeated and unconfirmed by any other mistake in the lantern or the evidence by Stilling's plates, is a person I regard as having a practically normal color sense. He also may be passed as safe. I regard his mistake as a mental lapse in the naming of a word, and not that he really confused red with green. Any person who is color blind by the plates should be rejected. Any person who cannot be taught in one sitting to name pale green or white correctly in any condition of contrast should also be rejected in the first instance, and if this defect is confirmed by Stilling should be finally rejected.

An authority on color testing states in his book that one mistake in red, white or green, should be followed by rejection. This opinion I consider to be unnecessarily severe.

Abstracts From Recent Ophthalmic Literature

AMBLYOPIA AND BLINDNESS

NIGHT BLINDNESS IN THE WAR.—BEST, F., Dresden (*Muench. Med. Woch.*, August 17, 1915). The author examined 36 cases of night blindness that was discovered among the troops at the front, and did not believe that the classification of this disease should be changed to include a special type due to trench activity. But he does acknowledge that hemeralopia does play a role that cannot be neglected, in the present war that is waged at night.

He estimated the degree of hemeralopia by the rapidity of dark adaptation and measured this by the "illuminated watch." The dial was made visible by the radiations of zinc sulphide, activated by exposure. In order to estimate the total degree of dark adaptation, the total surface of the dial was used and not the hands alone, which would have measured only the dark adaptation of the fovea.

The 36 cases could be divided as follows:

I. Hemeralopia due to disturbances of the liver, following injury by shrapnel. Incomplete and temporary.

II. Congenital hemeralopia. Discovered incidentally in the trenches.

III. Hemeralopia due to errors of refraction. Two-thirds of all of the cases were of this type.

IV. Hysterical hemeralopia. This occurred very seldom.

V. Hemeralopia following sun blinding. Only transitory.

VI. Hemeralopia following night service in the trenches.

VII. Hemeralopia due to hunger and emaciation, either with or without areas of xerosis. Always disappeared under hygienic treatment.

Only a moderately high degree of night blindness interfered with military service and rendered a man unfit for night duty in the trenches. With the exception of types II and III, all of the above mentioned cases were cured.

H. S. G.

AMBLYOPIA EX ANOPSIA.—SNELLEN H. (*Tyds. v. Geneesk.*, February 21, 1914). He treats his subject historically; he then comes to Priestley Smith's Bowman lecture (1898), where P. S. mentions to have found not only the strabotic eye amblyopia, but also the other eye. Snellen has found this also repeatedly, which he considers a strong proof, that although no change may be found

in the fundus, the amblyopia is still caused by an affection of the visual paths, somewhere between retina and highest centers, but probably in most cases more peripherically. Not only functional disturbances can be found, but often scotomata or narrowing of the visual field, which point to anatomical changes.

The very few cases, where the amblyopic squinting eye was forced to continual vision, after the first eye had become blind through injury (2 cases of Johnson, 1 of Hernheiser and 1 of Kleins) and regained normal vision in a short time are so rare that they can be explained by supposing that the nervus or tractus opticus had been sick and afterwards had recovered, perhaps justly under influence of the exercise. Besides many cases are opposed against these few, which are constantly repeated in the literature. He had observed for years a case of strabismus where the good eye was lost by accident and where the squinting eye remained as amblyopic as before. In another similar case the squinting eye had a vision of 6/18. After loss of the good eye the vision remained the same: only after some time a better correction could be found so that at the end vision was 6/8 with a sphero-cyl. combination. But something similar is often found without strabism in cases of compound astigmatism. His conclusion is that the amblyopia is neither cause nor result of the squinting, but has originated entirely independent of it, or is the result with the squinting of the same cause acting on the nerve elements. It speaks for itself, that the deviating eye should be the most amblyopic. Discussion.

Rochat saw in a case of amblyopia in a child of amblyopic family important improvement after a year exercising.

Blok mentions some cases, where in the presence of refraction anomalies and amblyopia of one of the eyes after correction important improvement was reached after exercise of the strabism and of the vision, the more this exercise started early in life.

Fuchs also saw much improvement through exercise of the strabotic eye. The amblyopic eye gained a vision 5/5. The original good eye diminished at the same time in vision. While this was again exercised and the vision improved the other eye became poor again. In another case where the good eye was shot, the vision of the second amblyopic eye increased rapidly.

Nicolai distinguishes between amblyopia from refraction anomalies and amblyopia through disturbances in retina, opticus, nerve paths and centers. He very seldom saw improvement of an amblyopic eye of a squinting.

Snellen once more states that he seldom saw improvement when something was wrong with the retina, opticus, etc., and is of the

opinion, that, when the vision does not increase, one must accept, even when the retina and disc are apparently healthy, an affection of retina, nerve or nervous centers, originated during early youth. He does not consider the cause of poor vision to be the exclusion of the psychic observation, but chiefly an organic defect. A patient with strabismus and poor vision of the deviating eye did not get improvement of vision after operation, but it diminished even, evidently through increase of the organic affection, the cause of the amblyopia.

Prof. van der Hoeve asks if speaker rejects amblyopia ex anopsia absolutely. Where through better correction of the refraction sharper images are formed on the retina the vision improves still through exercise of the eye.

Snellen does not deny this, but thinks that the better vision results, because the straightened and corrected eye learns better to focus. If the better eye is covered of such patients, who have hypermetropia, the poorer eye shows its total hypermetropia, while only the manifest hyp. can be demonstrated in the good eye. His theory does not include eyes with a pretty good vision, but a small one, $1/300$ th f. i. In these cases amblyopia ex anopsia is not present, but amblyopia through organic disturbances.

E. E. B.

CATARACT

A NEW CONJUNCTIVAL FLAP INCISION IN CATARACT EXTRACTION.—EWING, A. E., St. Louis, Mo. (*Amer. Jour. Oph.*, April, 1915). In operations that require perforation of the globe, and in accidental perforating injuries, the present day procedure is to cover the corneal or the scleral wound with some form of conjunctival flap. The writer describes a new method of obtaining such a flap which requires the use of the double fixation forceps; with this forceps the conjunctiva, over spaces 5 to 7 millimeters in width to either side of the cornea, is grasped in such a way as to cause the loose conjunctiva to fold moderately over the corneal margin. The corneal incision is made as usual just back of the clear cornea and this will naturally involve the folded conjunctiva. This provides a conjunctival covering to the corneal wound at the entrance of the knife, and at the exit of the counter puncture, which cannot be obtained in the ordinary conjunctival flap method, except by placing the corneal incision dangerously near the ciliary border; while in the nasal and the temporal quadrants of the wound, if the apex be vertical, the flap spreads out from the cornea like small wings, as a corneal protection.

The employment of the lance-shaped keratome renders the procedure practically subconjunctival, as there is no division of the conjunctiva at the nasal and temporal angles. Also the shortest portion of the flap is at the center, where it is most to be desired to facilitate the iridectomy, the removal of the capsule and the expulsion of the lens.

C. H. M.

A METHOD OF ARTIFICIAL MATURATION OF CATARACT ALLOWING OF EARLY EXTRACTION.—CLEGG, J. GRAY, Manchester (*Ophth. Review*, June, 1915). The author has adopted this procedure, which he does not claim to be original: "The pupil is dilated with atropine for one or two days before the operation. A paracentesis of the anterior chamber is made by an iris knife at the outer side. The aqueous is allowed to escape, an iris repositor is passed into the anterior chamber, and massage is applied directly to the lens capsule by it, taking care, however, that the capsule itself is not ruptured. Some twenty strokings of the lens capsule are made. After this further massage is made with the smooth lens scoop applied to the outer surface of the cornea. The movements are made in a rapid way radially from the center and backwards. One drop of atropine is instilled and a bandage applied. During the same day atropine solution is instilled again once, twice or thrice, according to the size of the pupil, and if the next morning the eye is perfectly quiet no further atropine need be used. Very commonly within two or three days definite opacification of the cortical layers of the lens is observable, and in several cases extraction has been proceeded with on the seventh day after the first operation. Extraction should not be resorted to, however, unless the pupil has recovered its mobility, and is again of the ordinary size, and unless there is absolutely no sign of irritability, the result of the massage operation."

J. M. W.

ON THE MANAGEMENT OF THE LENS WHEN ACCIDENTALLY DISLOCATED INTO THE DEPTHS OF THE VITREOUS DURING THE EXTRACTION OF A CATARACT.—HELFRICH, C. H., New York (*Jour. Ophth. Otol. and Laryngol.*, June, 1915). Exception is taken to the advice contained in Török and Grout in their "Surgery of the Eye" and in Meller's work "Ophthalmic Surgery" that no attempt should be made to fish the lens out of the vitreous with a wire loop. The author says it is the American custom to go after the lens at once with a loop and get it out, that the loss of a little vitreous is not a serious matter. He thinks the advice contained in two such prominent books should not go unchallenged.

M. B.

ON HEREDITY OF SENILE CATARACT.—ZYDEK, F. (*From the eye clinic of Prof. A. Peters in the University of Rostock, Klin. Mon. f. Aug.* 54, p. 482), gives a critical review of the incident literature, which shows an actual heredity of senile cataract. In correspondence with the experiences made in other hereditary diseases of higher age, e. g. arteriosclerosis, in some cases the succeeding generations become in more and more earlier periods of life affected with cataract. This may go so far that even congenital cataract must be interpreted in this sense. The collected casuistics do not contain a reliable example of indirect hereditary transmission of cataract, all other local or general symptoms lacking. As to the modus of heredity Peters pointed out two possibilities. Either the capsular epithelium in the germ plasma is insufficiently developed so that after a few years it cannot fulfill its task and the lens substance, especially the cortical, becomes opaque. Or the lens fibres themselves are inferior from the start and have a shorter duration of life.

In future observations of family cataracts more value must be laid upon the fact, whether it is a subcapsular cortical or nuclear cataract. If only the one or the other form occurred certain conclusions could be drawn also with regard to the origin of other kinds of cataract, in as much as nuclear cataracts would mean simple mortification of central parts of the lens exclusively, which could occur without shrinkage, a phenomenon that may be observed in zonular cataract.

C. Z.

ON EXPERIMENTAL PROGRESSIVE CHORIORETINAL ATROPHY AND CATARACT.—WESSELY, K. (*Arch. f. Aug.* 59, p. 1), produced by injections of 1% solutions of glycocholate and taurocholate of sodium into the vitreous of rabbits degenerations of the retina and chorioid eventually leading to considerable proliferation of connective tissue and extensive new formation of bone. The process was accompanied by more or less complete atrophy of the optic nerve. Of great interest were the simultaneous changes of the lens with development of total cataract. The degree of cataract formation always corresponded directly to the intensity of the atrophy of the chorioid and retina. Especially the cases with total atrophy of the optic nerve and complete disappearance of the medullar wings and the retinal vessels, in which the fundus presented the aspect of retinitis proliferans, finally showed total cataract, undoubtedly due to gradual disturbance of nutrition of the lens. These experimental changes of retina, chorioid and lens, resembled not only clinical pictures which occur in rabbits spontaneously, but also

definite phenomena of degeneration of the human eye. The changes do not stop with the period of action of the toxic agent, but show progressive character. W. attributes this to an ascending degeneration from the destroyed nervous elements and a progressive atrophy of the vessels from the chorioid. The same is true of the formation of cataract and heterotopic development of bone.

The chief object of W.'s experiments was, to demonstrate, that cell poisons, originating in the body itself, of the order of sapotoxins, are capable of producing severe changes of the retina, chorioid, and lens, and W. thinks that he thus reached a step nearer to the chemical explanation of auto-intoxication. C. Z.

CHORIOID

A CASE OF METASTATIC CHORIOIDITIS.—BOYLE, C. C., New York (*Jour. Ophth. Otol. and Laryngol.*, June, 1915). Two weeks after confinement a pelvic abscess developed with septic temperature. The right eye became inflamed, with symptoms of irido-chorioiditis. Examination of blood showed a streptococcic infection. A stock vaccine was given, also a subconjunctival injection of ten minims of 1-500 sol. cyanide of mercury. The pupillary exudate promptly cleared and the eyeball gradually whitened, but the vitreous remained hazy, the vision was moving objects and the eyeball was beginning to shrink. M. B.

CILIARY BODY

SOME ASPECTS OF THE CILIARY BODY IN HEALTHY AND DISEASE.—DUNN, PERCY H., London (*The Lancet*, May 29, 1915). In an interesting article on the functions and characteristics of the ciliary body and its secretions and the relation of the latter to the character of the blood, the writer dwells upon the controlling influences of the thyroid gland upon metabolic processes as a whole.

He contends that certain inflammations of the ciliary body are due to metabolic disturbances produced by hypothyroidism and that other signs of the latter are manifest in the patient in so-called serous iridocyclitis or "K. P." Apart from the ocular signs the patients complain of loss of appetite and flesh, of physical and mental depression, of coldness of the hands and feet, and of overwork, to the effect of which the signs are attributed. Thus these cases are met with mostly among women whose ordinary strength is unequal to the demands of their occupations. The metabolic origin of these signs, due to hypothyroidism, is proved by the

rapid improvement which follows thyroid treatment. With 3 grains, twice daily, of thyroid extract even in the course of a week a noticeable change ensues. A marked feature is the early return of the appetite, and partly, no doubt, from this patients soon begin to increase in weight. In the course of a few weeks the irido-cyclitis has cleared up, the appetite has become vigorous, physical and mental alertness have become visible in movement and facial expression, and convalescence is practically established. He believes that the same is true of cases of corneal ulceration among the poor, the cause of which is generally attributed to "debility;" these patients present the general signs of hypothyroidism and these signs vanish under thyroid treatment.

He next takes up the question of the relation between the ciliary body and metabolic toxæmia: the primary stage, represented by autointoxication arises in the intestines: to combat the toxæmia so-called, the thyroid gland, through its secretion, is called upon to make strenuous efforts under the influence of excessive stimulation; for a time these efforts are successful; later, the thyroid failing in its mission, there is hypothyroidism and a pervading uncontrolled toxæmia with diminished resistance of the tissues thus rendering them a prey to bacillary infection.

He believes that many cases of interstitial keratitis even though they occur in the subjects of inherited syphilis, have the general signs of metabolic toxæmia and depressed vitality arising from hypothyroidism: these patients he treats with thyroid extract using atropine and hot fomentations locally and obtains a cure of the ocular trouble and marked improvement in general at the end of three months.

In conclusion, the main purport of this paper is to lay stress upon hypothyroidism as a causative factor in cases of irido-cyclitis and upon the usefulness, clinically, of its recognition. That the ciliary body, so sensitive to toxæmic influence, should readily respond to thyroid treatment is a natural sequence to the vascularity of its structure. Thus is placed in the hands of the ophthalmic surgeon a means of relief, yielding results which can be obtained in no other way. The dose of the extract employed for children beyond 5 years of age and for adults is 3 grains twice daily, and from this dosage he had never seen any ill effects.

C. H. M.

CIRCULATION

THE PROGNOSTIC SIGNIFICANCE OF CHANGES IN THE RETINAL VESSELS.—KNAPP, ARNOLD, New York (*Med. Record*, May 29,

1915). The writer states that the presence of sclerotic changes in the retinal vessels presupposes with certainty a similar state in the cerebral arteries, but not the reverse; in general arteriosclerosis, changes in the retinal vessels of moderate degree are frequently present, occur in nearly one-half of the cases and especially in those in which the large cerebral arteries are particularly involved. In some cases of retinal vascular changes no clinical evidences of general sclerosis can be found, but these cases will show general symptoms sooner or later.

He enumerates the well-known physical signs: Increased tortuousness of the arteries, arterial pulse, a progressive peripheric venous pulse, variation in caliber in the blood column, "silver wire" appearance of the arteries, indentation of veins by sclerosed arteries, cockserew appearance of arterial twigs, congested appearance of the nerve-head, changes in the vessel walls as a result of which they become thickened, opaque and gradually transformed into white lines which sheath the narrow or obliterated blood current at the same time the lumen becoming narrow or occluded; also hemorrhages, oedema and exudates.

Regarding prognostic significance, the writer mentions Geis' results in which in 17 cases of distinct arteriosclerotic changes in the retinal vessels, death resulted in every instance from apoplexy within four years. Cases with the ophthalmoscopic picture of sudden closure of the central retinal artery or of a branch are to be regarded as examples of arteriosclerotic retinal disease when they occur in patients over 40 years of age with no evidence of any other cause or of a cardiac lesion. In these cases the ophthalmoscopic picture has the same prognostic significance as in the case of the visible arteriosclerotic retinal changes, though the apoplectic attack may occur somewhat later. Closure of the central retinal artery in young people up to 39 has no prognostic unfavorable significance. Vascular changes in the retina, due to syphilis, have not the same serious general prognostic importance as the corresponding arteriosclerotic changes. As changes in the veins (venous thrombosis) occur much more readily than in the artery, Geis' statistics show that in 50 per cent. venous thrombosis is a purely local change, though in 40 to 50 per cent. it was the precursor of cerebral vessel sclerosis. Really definite and serious prognostic significance is only given in those cases where in addition to the lesion in the vein the other retinal vessels showed sclerotic changes.

Retinal hemorrhages, if they are not due to local diseases or to abnormal blood conditions (anemias, etc.) occur when the vessel

walls are brittle, especially with the addition of increased blood pressure as in arteriosclerosis. These vessel changes need not be recognizable with the ophthalmoscope. They have the same prognostic significance that arteriosclerotic changes in the retinal vessels possess, though in Geis' cases the cerebral hemorrhages did not occur for a number of years. A distinction must be made in isolated hemorrhages occurring in the macular region. These seem to be due to local changes and have not the same serious general significance. This also holds good for the retinal hemorrhages occurring in syphilis. It is very important to realize the necessity of estimating the blood pressure in the presence of retinal hemorrhages. Its increase is a serious sign.

Aside from the usual picture of albuminuric retinitis, we find isolated retinal hemorrhages occurring in nephritis where there are signs of increased blood pressure, and which are probably due to arteriosclerosis. In this condition cerebral apoplexies are to be expected and in the cases which Geis was able to follow they always occurred. At the same time, death resulted at a later stage than is usual in albuminuric retinitis. Thrombosis of the veins occurring in cases with albumin in the urine should be differentiated from cases of albuminuric retinitis and isolated retinal hemorrhages occurring in nephritis, as they do not permit of any general prognostic deductions.

The conditions in *diabetic retinitis* are similar. Aside from the typical diabetic retinitis, we find hemorrhages which must be due to pathological changes in the vessel walls. In these isolated retinal hemorrhages in diabetics the blood pressure is increased in a large number of cases. A definite prognosis in diabetic retinitis can only be given in those cases of isolated hemorrhages associated with arteriosclerotic vascular changes which are to be regarded as precursors of more serious cerebral mischief. In the usual retinitis of diabetic patients just as in albuminuric retinitis, apoplexies occurred in only $1/3$ to $\frac{1}{2}$ of the cases.

Finally he discusses the attacks of obscuration which especially patients with vascular disease of the retinal arteries are subject to; these may be the forerunners of a permanent loss of sight and frequently precede partial or complete blindness. The cause of these obscurations is unknown; it may be a spasm; if so, the prognosis is different as it affects normal and pathological blood vessels. Such intermittent closing of healthy retinal arteries may occur without any lasting effect in vision. In diseased retinal vessels this phenomenon is of grave significance.

C. H. M.

A CASE OF RETINAL HEMORRHAGE WITH HIGH BLOOD PRESSURE, APPARENTLY FROM EXCESSIVE USE OF TEA.—DEADY, CHARLES, New York (*Jour. Ophth. Otol and Laryng.*, June, 1915). A woman of 35 who was a very moderate eater but an inordinate drinker of tea, developed a blood pressure of 170 mm. Hg. and retinal hemorrhages. Stopping her tea drinking brought her blood pressure down to 130 and resulted in clearing up of the hemorrhage. M. B.

RETINAL ANGIOSCLEROSIS AND ASSOCIATED LESIONS.—JACKSON, EDWARD, Denver (*Ann. Ophth.*, July, 1915). During the last third of a century angiosclerosis has grown definite and valuable. The most important advance was the recognition in the retinal vessels of definite changes visible with the ophthalmoscope. Marcus Gunn was one of the first to describe these appearances and Charles Steadman Bull was another. Their observations were so accurate that but little has been added. Gunn compared the color of the hardened arteries to burnished copper wire and the author thinks it better than the silver wire comparison. He thinks the tortuosity of arterial twigs would better be classed as a symptom of retinal inflammation or late toxemia. At arterial crossings over veins the latter is hammered by the overlying artery until its wall becomes thickened much as callous is developed in the skin by repeated pressure upon it. He questions whether these venous narrowings are signs of early sclerosis; he finds their presence frequently in normal eyes.

He disagrees with Gunn regarding the importance of distention of the vein to the distal side of its crossing of an artery, and the liability of such distension to cause hemorrhage. He has not found that such localities are subject to hemorrhage.

He thinks Bull in error when he speaks of weakening of the vessel walls being liable to cause aneurismal dilatations. He has not seen an unquestionable case among hundreds of cases that showed distinct evidences of arteriosclerosis. Other diseases of the vessel walls occur that are characterized by many aneurisms, as angiomatosis and the vascular disease described by Leber. He agrees with Bull in that retinal hemorrhage at an early stage of angiosclerosis is more likely to occur than later.

The brick-red color of the optic disc he has noted many times as an early symptom and regards it as a symptom of importance.

The general importance of this subject, especially the early diagnosis by the ophthalmologist while making an ophthalmoscopic examination during the fitting of glasses is especially to be commended. M. B.

² THE SIGNIFICANCE OF THE TRANSPARENCY OF THE RETINAL BLOOD COLUMNS.—PHILLIPS, W. L., Buffalo (*Ann. Ophth.*, July, 1915). Normally the retinal vessel walls are transparent and the column of blood contained therein is opaque. The transparency of a blood column means viewing the color of an underlying venous blood column through an overlying arterial blood column, or vice versa. Some allowance for the bright background should be made where this observation is made on the disc.

In 600 cases examined he found the blood column transparent 20 times. In these 20 cases a blood examination was made and the only condition found to explain it was a hemoglobin percentage running from 30 to 60 per cent. When the percentage was raised to over 80 the blood column again became opaque. The presence of arterial sclerosis, which causes the vessel wall to be opaque invalidates this test.

M. B.

CONGENITAL ABSENCE OF THE ARTERIA CENTRALIS RETINAE WITH EMBRYONIC REMNANTS OVER THE MACULA LUTEA.—LLOYD, R. L., Brooklyn (*Jour. Ophth. Otol and Laryngol.*, Aug., 1915). The anomalous condition occurred in the eye of a man who had divergent squint of nine years duration. There were no central vessels in the nerve head. There was, however, the usual arrangement of vessels in the fundus and some large ciliary vessels. There were pigment changes on the macular side of the disc and a large plaque of glistening white material which occupied the whole macular region.

M. B.

CONJUNCTIVA

GRANULOMA CONJUNCTIVAE PRODUCED BY A FOREIGN BODY.—DE HAAS, H. K. (*Tyds. v. Geneesk.*, Oct. 17, 1914), showed a coupe through a cyst of filbert size of the conjunctiva bulbi, which protruded outside of the eyeleft. The wall of same layers of pavement epithelium exists. After extirpation the conjunctiva was sutured, the somewhat prominent bulb pushed well behind the lids and a bandage applied. Two days later a swelling of the conjunctiva around the wound attracted attention. A new tumor formed, which was larger after five days than was the cyst; it infiltrated Tenon's capsule and the conjunctiva and progressed towards the lower cul-de-sac and external angle. This new product was removed 12 days after the cyst. Young connective tissue with very many accumulations of leucocytes was found and in the densest spots numerous giant cells. These made one think of foreign bodies, not of an in-

fections tumor. Only under the polarization microscope nearly every giantcell was found to contain a plantfiber. It was, therefore, a granuloma produced by the shreds of the bandage originating with imperfectly closed lids.

E. E. B.

THE TREATMENT OF GONO-BLENNORRHOEA OF THE NEWBORN AND ADULTS AT THE EYECLINIC OF THE UNIVERSITY OF BERN.—SIEGRIST, A., AND SCHENDEROWITSCH, P. (*Klin. Mon. f. Aug.*, 54, p. 288). Since 1907 nitrate of silver has been supplanted at the clinic of Bern by collargol 3% and syrgol 5% in the treatment of blennorrhoea, as their application does not, like the former, require eversion of the lids, and consists only in instillations. Fifty-three newborn children were treated with collargol, 43 with syrgol, and are reported in tabular form. The results not only in ordinary but also in cases of severe corneal complications in the newborn and adults were equally good. Occasionally syrgol caused in the newborn offensive diarrhoea and disturbance of the general condition.

C. Z.

IS THERE A SYMPATHETIC AMBLYOPIA?—KEUTEL, J. (From the eye clinic of Prof. A. Peters in the University of Rostock. *Klin. Mon. f. Aug.*, 54, p. 250). Out of 48 cases published as sympathetic amblyopia, Schirmer, in his article in Graefe-Saemisch's handbook, weeded out 23, so that 25 remained, although some authors did not concede the existence of a sympathetic amblyopia especially Elschning, Pfalz and Peters. Therefore K. again critically investigated the cases admitted as such by Schirmer and also the later ones, which are discussed in more or less detail. His conclusions are that none of the cases can bear severe criticism. Some emphatically prove that functional disturbances of the central nervous system play here an important part, aside of the possibility of simulation. It seems, therefore, time to eliminate sympathetic amblyopia as independent clinical pictures from ophthalmological literature. The explanation in the majority of cases in which after enucleation vision improved is that irritation symptoms—photophobia and lacrimation—ceased which mechanically and functionally had diminished vision. Or suggestive influences existed which effected a speedy improvement of the amblyopia and the simultaneous contraction of the visual field.

C. Z.

CORNEA

DOUBLE-SIDED PIGMENTATION OF THE CORNEA.—WAARDENBURG, P. J. (*Tydschr. v. Geneesk.*, Feb. 27, 1915), found as cause of slight

diminution of vision a pigmentation of both cornea and very fine peripheral opacities in both lenses. Pat. was a lady, 43 years old, who had V. 5/6 f. with H. O. 15 D. The corneal pigmentation is about symmetrical, a broad streak of very fine color particles, downward and to the nasal side. The streak occupies about half of the cornea. The upper part which is left free is larger than the lower part. The streak is the broadest (2 to 2.5 mm.) a little below the corneal center. The pigmentation is peripherically the least dense. The pigment sits clearly against the posterior wall of the cornea.

W. considers the lens opacities to be a light form of congenital zonular cataract, and the pigment deposits to be congenital melanose of the cornea.

E. E. B.

THREE CASES OF KERATITIS PARENCHYMATOSA CURED BY SALVARSAN OR NEOSALVARSAN.—KOENIG, Beirut, Syria (*Munch. Med. Woch.*, Aug. 10, 1915). A recitation of three typical cases of keratitis parenchymatosa due to congenital syphilis remarkably improved and ultimately cured by repeated injections of Salvarsan and Neosalvarsan, together with the usual local therapy. This article was inspired by several modern text books that disclaimed any advantage in this disease from the use of these specifics. H. S. G.

BILATERAL SYMMETRICAL DEGENERATION OF THE CORNEA WITH DEPOSITS OF URIC ACID AND URATE OF SODIUM IN OTHERWISE NORMAL EYES AND NORMAL GENERAL CONDITION.—UHTHOFF, W., Breslau (*Klin. Mon. f. Aug.*, 54, p. 383). A man, aged 53, had an inflammation of his eyes when 20 years old, which relapsed several times. He came to the clinic in 1897. The affection was diagnosed as episcleritis, extending into the marginal portion of the cornea. In 1909 he came again with great changes of both corneae, which presented in their marginal portions an almost circular broad zone of a yellowish grey deep opacity, leaving the upper segment free. This had considerably increased in 1913 under occasional inflammatory irritations, only the center and the upper eccentric portion had remained free. Under the loupe the opacity showed deposits glistening like gold, resembling cholestearin masses $N=6.8$. A superficial layer was excised and examined microscopically, which is described in detail. The changes consisted in degeneration and the formation of vacuoles and of a reticular tissue between the preserved epithelium and Bowman's membrane. The deeper strata of the corneal stroma showed fibrillar degeneration with clefts and cavities. The deposits consisted of crystals of acid of sodium and of uric acid, which gave murexid reaction. U. could not find

a similar observation in literature. The patient had rheumatism but not gout, except slight nodules at the fingers. The affection of the cornea did not yield to any kind of treatment. C. Z.

ON SENILE MARGINAL ATROPHY OF THE CORNEA.—FUCHS, E., Wien (*Arch. f. Ophthalm.*, 89, p. 386), described in 1901 under this name the anatomical changes of a gradually developing furrow at the margin of the cornea. Quite a number of cases have since been reported clinically, and it seems that two groups can be distinguished, younger persons in whom slight inflammatory phenomena set in, and old individuals, in whom the furrow develops indolently in connection with arcus senilis. F. now gives the anatomical description of the eye of a man, aged 70, which he believes showed the beginning of the disease. Comparing the changes of this with farther advanced cases, he found the progression of the disease to be this: 1. The changes always go into the depth, not into breadth. 2. The thinner lamellae produced by fissuring of the corneal lamellae assume more the aspect of, or are substituted by, connective tissue which grows with the vessels from the limbus into the diseased zone. At the central margin of the furrow it enters between the ends of the lamellae. With the connective tissue and vessels also other cells appear, but those arising from the fixed corneal corpuscles, and a slight inflammatory infiltration may set in. 3. Total disintegration of the corneal lamellae, at the central border of the furrow. At the beginning it is lack. Ectasia of the button of the furrow and subsequent stretching of Descemet's membrane with its sequelae, as rupture, distraction or thickening by superposition. C. Z.

A CASE OF BILATERAL, CENTRAL, PUNCTIFORM, SUBEPITHELIAL KERATITIS, "NODULAR KERATITIS GROENOUW," WITH ANATOMICAL DESCRIPTION.—UITHOFF, W., Breslau (*Klin. Mon. f. Aug.*, 54, p. 377.) A man, aged 24, first noticed in his 15th year an opacity before his eyes and saw, especially toward the sun, small dots. Prof. Groenouw then diagnosed nodular keratitis and recommended scraping of the central superficial layers. Out of the eight children of his family only three could see well, and an uncle had the same affection, according to the patient. Under the loupe the centers of both corneae showed numerous small grey foci, mostly round, some linear, under the smooth epithelium, partly confluent, giving the appearance of foam. The periphery was free, excepting some minute dots at some places. Repeated scrapings had no effect, so that U. abscised the superficial layers with a narrow knife as far as

the healthy tissue, 1.3 mm. thick and 2.50 mm. long. The microscopic examination revealed (1) partial focal thickening of the epithelial layer with destruction of Bowman's membrane at some places, (2) small foci of partly brittle, partly homogeneous hyaline masses in the subepithelial strata of the corneal stroma, crowded between the lamellae, partly originating directly from hyaline degeneration of the corneal tissue. The epithelial layer was mostly intact and the stroma essentially normal without inflammatory changes. The incident literature is quoted, also the recent anatomical communication by E. Fuchs, who considers the nodular keratitis as a disturbance of nutrition or dystrophy, characterized by excretion of substances not soluble in the tissue juices. C. Z.

STAINING OF THE SUPERFICIALLY DISEASED CORNEA WITH FLUORESCHEIN AND BIEBRICH SCARLET RED.—REITSCH, D. Hirschberg i. Schles. (*Arch. f. Ophth.*, 89, p. 299). Fluorescein acts only if the epithelium covering is broken or a certain loosening exists in the most superficial erosions not reaching to Bowman's membrane. It does not stain epithelial cells nor any other tissue of the cornea, but diffuses into places of the cornea, whose epithelium and endothelium are diseased. According to Groenouw and Fromm only the cement substance between the cells and the lymph spaces between the proper substance contain the coloring matter which rapidly penetrates beyond the defect and thus stains also the adjoining zone green, so that we are deceived as to the actual size of the defect. The green color is not well visible in artificial light. Here, R. found 3% solutions of Biebrich scarlet red extra fine, which is a direct stain for the tissue and does not diffuse, far superior. Excoriations e. g. after phlyctenular infiltrations are stained intensely red by it, not by fluorescein which cannot penetrate between the densely crowded cells. Superficial keratitis with characteristic figures as in herpes are well stained by scarlet red and show very sharp contours. In herpes R. found a double staining with fluorescein and scarlet red very useful: the defect had sharp red borders and the surroundings were green. For making the solutions antiseptic R. recommends the admixture of oxycyanate of mercury. The stain ought to be applied with a glass rod, not with a pipette. C. Z.

ON NODULAR OPACITY OF THE CORNEA.—FUCHS, E., Wien (*von Graefe's Arch. f. Ophth.*, 89, p. 337), gives the anatomical description of two cases in men, aged 50 and 29. The superficial layers of the cornea were removed with the trephine for kerato-plasty according to von Hippel, and the pieces hardened in alcohol and stained

according to Giemsa, Leishman and May—Grünwald (methylene blue—eosin). As confirmed by all observers, as Groenouw, Chevallereau, Paderstein, Puscarin and others, and the eight cases of Fuchs, published in 1902, and more seen by him since, it is characteristic of nodular opacity of the cornea, that aside of the larger grey nodules the remaining cornea is occupied by dense minute grey dustlike spots. Anatomically the essence of the disease consists in the sedimentation of a granular basophilic substance in the cornea itself, which was found in all cases and apparently accessory to this the deposit of an often stratified acidophilic substance upon Bowman's membrane immediately under the epithelium, which in Fuchs' sections stained red, the basophilic blue. Secondary in all cases are changes of the epithelium, the attenuation and destruction of Bowman's membrane, loosening and partial destruction of the corneal lamellae, perhaps also their swelling, and the occasional augmentation of nuclei at some places.

Thus the nodular opacity of the cornea is a disturbance of nutrition or dystrophy, characterized by the accumulation of substances, which have become insoluble in the tissue juices. In this way it belongs to the numerous similar processes, which are known to the pathologists and occur in consequence of senium or severe general disturbances of nutrition (e. g. amyloidosis) or deranged function of glands of inner secretion (e. g. myxedema). As senium and severe general disorders of nutrition play no part in nodular opacity of the cornea, one may think of alteration of inner secretion, although the extant experience has not shown in which direction this alteration has to be sought. F. thinks in future cases Abderhalden's method, perhaps, might gave a clue.

C. Z.

CONTRIBUTION TO THE CLINIC AND PATHOLOGICAL ANATOMY OF RODENT ULCER OF THE CORNEA.—EPALZA, ENRIQUE, Bilbao, Spain (From the eye clinic of Prof. Th. Axenfeld in the University of Freiburg, *Klin. Mon f. Aug.*, 54, p. 266), gives the clinical history of a case of rodent ulcer of the right eye of a man, aged 23, which had to be enucleated on account of excruciating pain, and describes the histological changes. The affection commenced with an infiltration of the limbus, which suggested like in episcleritis a possible hematogenous origin, but there was no thrombosis in the episcleral vessels. The whole process did not make the impression of a primary necrosis of the cornea, but that an immigrating granulation tissue corroded and destroyed the cornea, both processes being due to a common infectious cause, perhaps an infectious episcleritis.

In another case an intercurrent diplobacillar infection had a bene-

ficial effect. As this infection can be fairly controlled by zinc, the attempt of a bacterio-therapy seems indicated and is planned by Axenfeld in future cases. C. Z.

GENERAL DISEASES AND THE EYE

EYE SYMPTOMS IN KAPOSI'S DISEASE, XERODERMA PIGMENTOSUM.—CROSS, F. RICHARDSON (*Ophthalmic Review*, July, 1945). The author gives a description of the skin lesions in this disease, which has been called *Atrophoderma pigmentosum* and *Xeroderma pigmentosum*.

The pigmentation and thinning of the eyelids is associated with a dry and rough conjunctival surface and with shrunk eye lashes. On the lid edges may occur warts, or inflamed papules like styas, which tend to ulcerate. Nodular swellings may grow on the skin surface of the eyelids and towards the caruncle. The ocular conjunctiva is usually hyperaemic, from a general congestive fullness of the vessels, or with acutely inflamed patches which often run to the edge of the cornea. Some cases are said to have shown pterygium, but the nodules are probably more frequently alliked to phlycten or pinguecula. The edge of the cornea seems particularly prone to implication—a patch of hyperaemia simply, or complicated with swelling and deposition of cells which may absorb again, or may form corneal ulcers, or else lead on to the formation of a neoplasm. The cornea itself becomes hazy from infiltration of its substance, or from swelling of the epithelium. In these cases there is photophobia and blepharospasm. Ectropion is frequently present, and leads to opacity or ulcer of the cornea, but in many of the cases that have been depicted—Crocker's and others—the eyes are open and the light seems to be well borne. The optic nerve and the intra-ocular structures are probably not affected excepting as a late complication of more superficial lesions, and even iritis is probably seldom present unless the cornea has first become very deeply affected.

The author advocates the repeated removal of the growths and curetting of the ulcers, the application of massage and calomel ointment.

Two cases of this disease are reported in detail, a boy of eleven years and a sister eighteen months younger. J. M. W.

OPHTHALMOPLEGIC MIGRAINE.—VAN ROMUNDE, L. H. (*Tyds. v. Geneesk.*, March 27, 1915). Up to 1911 Flatau could gather in the literature about a hundred cases and only few more have been

published since. On account of the relative rarity he reports two new cases, after having gone over the known facts. A 29 years-old man comes with the following history: Since his 15th year he has regularly every year between February and May an attack of severe headache and vomiting during a few days followed by paralysis of the ocular muscles, always at the right side. The pupil has remained large since the first attack; the other paralyses had recovered; only a slight paralysis had remained from last year. The disease is not familiar. Since a few days he had had another attack, while the headache had gone. No aura. V. O. D.=6 12 with +1 sph.=6 6 V. O. S. 6/6 E. Tension of both eyes normal. No narrowing of the right field. Ptosis of the upper lid through paralysis; after lifting the dilated pupil was seen, which did not react on light nor convergence; the eye could be moved alone to the temple and downward. Treatment: Faradisation and I. K. Four months later the ptosis was much better, the paralysis of the other muscles about the same. Wassermann negative; no malaria parasites; urine=N. v. R. considered that malaria should not be excluded, as the examination was done outside an attack. He resolved to give quinine. Another four months later the ptosis had disappeared. The other muscles have only slightly recovered. The time approached slowly that another attack was due, so patient took from now on one grain of quinine. He would return as soon as the attack should show. On April 1st he tells that he has had in the morning headache during one hour, that his right eyelid dropped slightly and was troubled with double images. He received two grains of quinine daily. Three days later the ptosis had disappeared and patient has been all right since. On the day of the attack his blood was free from malaria parasites. No hemiopic pupillary reaction. Up to a few months ago patient continued taking one grain quinine daily. For cosmetic effect twice daily pilocarpin. The upper eyelid does not make the normal co-movement on trying to see up or downward.

2. This 15-year-old girl appeared in the dispensary (Utrecht) in October, 1912, with the following anamnesis: About six years ago she had an attack of headache and vomiting; then slowly on the left eye could not be opened. After three or four weeks all symptoms had disappeared. During the last six years she had often headache with vomiting, without paralysis. The parents also suffer frequently with headache with vomiting. Patient had suffered from a rheumatic affection and scarlatina. O. S. V. with +0.75:6 6. Mydriasis T.=+1. Field of vision, external muscles, N. Urine, no albumen.

Cor bovinum, dilatatio cordis to the right, endocarditis after rheuma.

February, 1913. V. O. S.=6/18. Mydriasis. T. O. S.=—1. Diagn.=:Glaucoma simplex incipiens. Trepanatio sclerae. Patient leaves hospital with V. O. S. after corr.: 6/8.; T.=N. May 20, since two days severe headache with vomiting. The left eye becomes shut. Total oculomotorius paralysis. Urine contains albumen. Wass. neg. Discharge on June 17: ptosis nearly healed, not the other paralysees. On November 30 again admitted for a megrim attack. The sixth attack of this year develops, and again on February 24, 1914. On March 7th discharge without complaints. Beside the mydriasis the oculom. paralysis has entirely recovered.

On account also of the previous findings v. R. concludes that ophthalmoplegic megrim must be localized peripherically. This opinion is strengthened by the fact that the internal muscles are nearly always affected, which does not happen with nuclear affections, and that the attacks are always one-sided and combined with headache. And the absence of the hemiopic pupillary reaction speaks against a nuclear affection according to Behr. The megrim is primary and the paralysis secondary. Probably a patient suffering from megrim acquires through endo or exogenic influences a less resistant N. oculom. and now the ophthalmoplegia will follow as result from the megrim attack.

C. F. Engelhard shows a four-year-old girl with the following history: Birth, normal: six days old, a right-sided ptosis which disappeared after a fortnight. This ptosis returned during the first two years at regular intervals, always at the same side, to disappear after about a week. In the first year was noticed that the right pupil was larger than the left one, and that the sick eye remained often quiet when the good one was moved. Beginning with the second year the periodical paralysis began with a typical homolateral megrim attack. These attacks became more frequent. The ptosis lately was not always complete, but attacks of headache without a change of the right upper eyelid were not observed. The body and psyche are normal, only lately she has become irritable. Wass. and Pirquet: N. Heredity, absent. Once in the clinic the child had a half-sized attack of headache with vomiting, followed by ptosis, which disappeared again slowly. Sp. diagnoses recidiving oculom. paralysis—passing as "migraine ophthalmoplegique." The separation between this and the common form of megrim would be much easier if all cases of the ophthalmoplegic form would be combined exclusively with oculom. paralysis. The difficulty remains, because usually year after year the common megrim attacks appear

with only from time to time an ophthalmoplegic attack. In this case the periodic paralyses seem to have originated without headache. The very youth, however, produces some doubts.

Between the attacks the paralysis of the sphincter iridis were combined with a paralysis of the M. rect. sup., oblq. inf. and rect. inf., while the m. rect. int. only was paretic (the bulb in rest did not deviate outward) ; no ptosis. The N. trochlearis must have been somewhat injured. The bulb remained quiet when a trial was made to see up or downward, and also the upper lid. This observation favors the opinion that anyhow for this child the upper lid is pulled mechanically in normal circumstances by seeing up and downward. Sp. will not generalize, because he knows from the literature some cases where with a paralysis of the upward rollers the m. lev. palp. was innervated with an attempt to see upward, so that a broad scleral margin became visible above the cornea. And he does not know of cases where with a paralysis of the downward rollers the upper lid went downward by an attempt to see downward. Sp. showed photos to demonstrate that on seeing downward the co-movement of the upper lid happens indeed mechanically. These co-movements are very difficult to explain by a diminution of the tonus.

Discussion.—Plantenga recalls his communication of a similar condition in 1899. The attacks in one of his patients showed from time to time elevation of temperature and once an eruption of facial herpes. Heredity was absent. The prognosis *quoad vitam* is generally faust, as in his case.

Roelofs opposes the opinion, that in such cases the migraine always would proceed the paralyses, and mentions that the headache can be the result of attempts to fusion, ocular muscle paralysis being present. Mulock Houwer saw two patients with complete oculom. paralysis after migraine, who did not entirely recover. The cause in one case was fracture of the base of the skull, unknown in the other. The affected upper lid in both cases remained undisturbed during up and downward seeing. Willbrand and Saenger mention a case where the upper lid moved upward during seeing downward. This speaks against the theory of mechanical co-movement.

Van Zadelhoff has seen in this practice as general physician in many malaria cases paralyses of ocular muscles which recovered after quinine and arsenic.

Schoute inquires about the galvanic irritability of the m. lev. palp.; Wertheim Salomonson had found during the beginning of the presence of the paralysis appearance of galvanic irritability of

that muscle, while it could not be demonstrated in normal muscles, has not been examined. Engelhard thinks that the lifting of the upper lid, mentioned by Wilbrand and Saenger, can originate through flowing off of the innervation toward this muscle.

E. E. B.

A CASE OF OCULAR TUBERCULOSIS.—VERWEY, A. (*Tyds. v. Geneesk.*, Oct. 17, 1914), shows a 20-year-old woman whom he saw about a year ago with a greyish-red nodule of the iris, which had all clinical symptoms of a tubercle. The treatment was chiefly rest, good nourishment and bed, locally atrop., hydr. perox., jodoformsalve boric acid and yellow salve; internally, mercury and K. I. No familiar predisposition was found, neither lues. Pirquet pos., Wass. neg. Temp. normal. After a few months condition had improved so that patient was discharged. The iris showed a scar, but the superficial and deep injections had disappeared. However, condition lasted only a short time. The inflammation started up again and patient was admitted again. New disseminations, also in the cornea, appeared and months passed before the condition was as now shown. The surface of the cornea shining with fine blood vessels, in the tissue proper irregular opaque spots with a few very fine grey points; iris still thickened with a few grey foci. We have here a serious case of tuberculosis of iris and cornea. Besides the condition of the other eye is important; it has V.: 3 10 with +1 sph. 7/10. Externally nothing important visible; ophthalmoscopically the disc is found hyperaemic and somewhat veiled, the veins are somewhat thicker and darker and the arteries have white shining sheaths. For different reasons most in favor is to think of a congenital anomaly. One ought to keep in mind the possibility of a tubercle of the disc, or a toxic papillitis.

No tuberculin was used. However, during her first stay recovery took place remarkably quick. The second attack proved much more inveterate. How easy a wrong impression would have been created, if tuberculin had been injected. Very often the necessary sober critic is missed even in the tuberculin treatment of ocular tuberculosis, where the condition can be followed so easily. The more and more accepted treatment of vaccination opens new vista also for the tuberculin application. The sensitized tuberculin of Fritz Meyer, made at Höchst deserves attention. But one should perhaps have the right before using it, that it would show effect in experimentally, rather along the circulation produced, tuberculosis.

E. E. B.

A CASE OF ANTHRAX.—RASSERS, J. R. F. (*Tydschr. voor Vergelykende Geneeskunde*, Vol. 1, No. 1, a new journal, just started) received in the surgical clinic a man who had a particular looking swelling above the left eye, on July 5, 1913. The swelling was pretty well circumscribed, of the size of half a dollar. The center looked fungoid with purple color; in the direct surrounding some small openings from where droplets of serous fluid. A slight edema, no redness around the swelling. A small gland was palpable in the angle of the left jaw. Patient had slaughtered a cow suffering with anthrax two weeks ago. Four days later a small pustule appeared above the left eye, which itched much. It increased slowly to the size of a strawberry. Small openings appeared in it, surrounded by brown vesicles, from which a greenish yellow fluid. Afterwards the surrounding also began to swell. Microscopical examination of the serous fluid showed anthrax bacilli, which were mixed with a colibacillus and a paratyphusbacillus as antagonists. Compresses with sublimate 1/2000; the glandular swelling had disappeared in a few days, the necrotic center disappeared very slowly. On the 9th of August patient was discharged cured. Temperature had never been higher than 37.6 (per rectum).

Rassers mentions also another case of mixt-infection and demonstrates the experience, first found by Pasteur, that the development of the anthrax bacillus is mitigated by other micro-organisms, which render the prognosis much more favorable. These mixed infections naturally change the classical aspect of the pustula maligna and will often not be recognized. In the following case pure cultures of the anthrax bacillus were found without any antagonists.

Patient had helped in incinerating a cow died from anthrax on March 12. He did not feel well on March 21st and had shown his physician, calling for his cough medicine, which he did regularly a small vesicle at the external upper eye corner. The aspect did not point at anything serious. On March 22d edema of upper and lower lid appeared, which had progressed next day. On entering the hospital an extensive soft edema of the left side of the face was present, extending over the anterior part of the skull and lower jaw, neck, clavicle and part of the thorax. Upper and lower eyelid are much swollen, left nasolabial fold had nearly disappeared, upper and lower lip project thick swollen. Nowhere redness. A small defect of the skin of the upper eyelid, a similar, little larger at the external upper margin of the orbit. Serous fluid is secreted in drops here. Patient is entirely *mentis compos*, complains of

much pain, temperature 39.2 (per rectum). A few hours after arrival 20 c. M. anthrax-serum is injected subcutaneous repeated next day with intravenous injection combined. Compresses of the face of sublimate 1/2000. Condition becomes worse, temperature increases to 40.1 and patient succumbs.

E. E. B.

A CASE OF IDIOTICA PROGRESSIVA FAMILIARIS INFANTILIS (TAY. SACHS), COMPLICATED WITH HYDROCEPHALUS CHRONICUS, GIGANTISMUS AND ADIPOSITAS UNIVERSALIS.—DE BRUIN, J. (*Tydschr. v. Geneesk.*, January 30, 1915, p. 495), saw in December, 1913, for the first time a 15 months old girl, the second child of Jewish parents, who were cousins: the great-grandfather of the father came from Russia. No potus, neither lues of the parents. The oldest child, a boy, 2, 5 years old, was healthy. This second child, born a terme, asphyctic without manual help, developed normally during the first half year. From then it retrogressed gradually mentally and bodily, so that it was practically blind, and could not sit, stand nor go, nor could the head be kept straight; no spontaneous motions of the extremities were made: it was perfectly dull. It weighed 13.5 K. G.; panniculus adiposus much developed. Head remarkably large, circumference 49 c. M., the large fontanel still open. All muscles of the body lax, the feet in equinus position. No lidreflex on nearing the eye with the finger. In both eyes the discs atrophic and the characteristic changes in the macula: a grayish-white horizontal oval, in the center of which a small dark-red spot. In the beginning of 1914 the child had convulsions for the first time, which from then came daily. In the middle of June, 1914, the child measured 83 c. M.; it weighed 14 K. G.; the circumference of the head was 52.5 c. M., of the thorax 51.5 c. M. A skiagram of the skull showed a flattening and usure of the bottom of the sella turcica. de Bruin supposes that the gigantismus and adipositas universalis depend on the pressure of the hypophysis region through hydrocephalus of the third ventricle.

The combination of familiar amaurotic idiocy with hydrocephalus has only been observed in two cases, by Sachs and Strauss and by Coriat. Up to this case the literature did not contain among the about 125 cases one observed in the Netherlands.

E. E. B.

ON KERATITIS PUNCTATA LEPROSA AND HEMATOGENOUS ISOLATED BACILLAR METASTASIS IN THE AVASCULAR CORNEA.—AXENFELD, TH., Freiburg (*Klin. Mon. f. Aug.*, 54, p. 201). An

Italian, aged 25, returned from Brazil with typical tuberculous leprosy, which he kept secret. It was however recognized from the condition of the eyes. Years ago the right eye was injured by a foreign body that penetrated the center of the cornea and lens. There was a fine scar of the cornea, narrow pupil, circular synechia to a pseudo-membranous secondary cataract, pericorneal orange-yellowish thickening of the episcleral resp. subconjunctival tissue (Leproma of the conjunctiva). Under the smooth epithelium of the cornea were minute fine grey dots without any communication with the margin. As this eye was amaurotic and sensitive to touch it was enucleated. The left eye also showed orange-colored thickening of the limbus and episclera.

The microscopical examination of the right eye revealed abundant lepra bacilli in the episcleral leproma, in the isolated grey foci of the avascular portion of the cornea close under Bowman's membrane, and some in the epithelium, without connection with the vascular margin, without new formed vessels and without infection from outside. How were these foci "metastases" of immovable bacilli possible? A. considers the following possibilities: Diffuse spreading in the clefts of the tissue or a transport and localization by cells, i. e. phagocytosis of the living virulent bacilli by migratory cells. The specimens contained very few ordinary leukocytes, but corneal corpuscles with bacilli, and A. reminds of the "migratory cells of the fixated corneal corpuscles," described by Marchand Gôke, Klemensiewicz and others. This is of principal importance for the pathology of the cornea and suggests the possibility of hematogenous metastases of other germs and other diseases, e. g. tuberculosis.

While cornea, episclera, anterior portion of sclera, iris and ciliary body were pervaded by millions of bacilli, the chorioid, retina, and optic nerve appeared entirely free from them. This is the rule and the deeper parts of the eye are only relatively rarely affected by leprosy, and is a further interesting instance, how the different hematogenous infections prefer their special localizations.

C. Z.

CONTRIBUTION TO THE RELATION BETWEEN ACUTE RETROBULBAR NEURITIS AND MULTIPLE SCLEROSIS.—TARLE, JACOB (From the eye clinic of Prof. von Schleich in the University of Tübingen. *Klin. Mon. f. Aug.*, 54, p. 412), reports on 29 new cases, observed at the clinic since the publication of Fleischer in *Klin. Mon. f. Aug.*, 46, p. 113, reviewed in Ophthalmology. Only acute cases with the typical clinical picture were considered, excluding the not acute

cases with more chronic course deviating from the typical aspect and all due to affections of the orbit and nasal sinuses and intoxications. Two-thirds of the cases were females, more than $\frac{2}{3}$ of all $\frac{3}{4}$ of the female, occurred at the age between 15 and 30. The average age of men was 29, of women 27. As causes were stated; Over-exertion, slight febrile diseases, disturbances of the nervous system, loss of blood, acute infectious diseases. In none the affection was distinctly attributed to cold.

The course of the disease in most cases was typical: Vision was suddenly impaired by a more or less dense fog. First a central scotoma for colors, than a relative and later absolute central scotoma for white was found which rapidly spread, leaving remnants of the peripheral visual field or even amaurosis. In 24 cases vision was very much reduced. The amblyopia lasted from a few days to about 4 weeks, and disappeared in the same way it came. First the peripheral portions of the visual field are restored, then the central scotoma grows smaller, finally more or less marked scotomas, absolute or relative, remain or vision becomes normal. This occurred in 11 cases, good central vision for white but central disturbances of color perception and paracentral scotoma in 6, moderate central impairment of vision with scotomas in 7 cases. In 5 ambulant patients the final result could not be ascertained.

Other ocular symptoms were: Pain in moving the eyes and upon pressure, especially at the beginning; pupillary disorders were frequent, inequality of the pupils occurred in 8.

The affection was bilateral in 4 cases, in 1 one eye became affected after the other. No palsies were observed, but in some cases the anamnesis pointed to their precedence, nystagmus in 2 cases. The Ophthalmoscope revealed different conditions: No changes in the beginning in 4, in most cases from the start various degrees of deviation in color and contours, i. e. inflammatory, in 2 marked swelling of the disc and intense venous congestion. At the final observation pathological conditions invariably were found: Different degrees of postneuritic atrophy, partly marked pallor of the temporal half of the disc, from which the cases with restitution of normal vision were not excluded.

F.'s investigations again confirmed the great importance of acute retrobulbar neuritis as valuable early symptom of multiple sclerosis. Not only the observation of the further fate of the patients, affected with retrobulbar neuritis, but the careful examination by neurologists of these cases at the beginning of the ocular affection proved that more than $\frac{1}{3}$ of them, and if those with probable diagnosis are included, more than half presented simultaneous

other neurological symptoms, which with the eye disease established the diagnosis of multiple sclerosis. C. Z.

TRANSITORY HYPERMETROPIA IN DIABETES.—RÖXNE, HENNING, Copenhagen (*Klin. Mon. f. Aug.*, 54, p. 207). A woman, aged 47, who for a month had suffered from great thirst and weakness, showed 8% sugar in the urine. After about a week she suddenly noticed on awakening in the morning that her vision for distance and reading was considerably diminished. Four weeks later she consulted R., who found hypermetropia $+3 \text{ V } 6/6$. With $+4$ she read the finest print. So far she had $+1$ for reading, so that the accommodation and the normal value corresponding to her age. After a fortnight she suddenly could not see any more with her glasses and had now normal vision with $+0.50$. The sugar had disappeared under strict diet.

The case corresponded with all other cases published, in which the hypermetropia was always transitory for 1 to 2 months, subsiding gradually, but deviated from them by the sudden disappearance of the hypermetropia. R. assumes the following explanation: Diabetes might successively create chemical changes of the lens substance leading to latest abnormal tension in the lens fibres. If this reaches a certain point it suddenly exceeds the shape imparting forces and alters the position of the strata of the lens to each other without mutation of the external surface, producing so to speak a negative intracapsular accommodation. This may be compatible with the persistence of the accommodative faculty, corresponding to the age, and may explain that the change of refraction seems to occur only in individuals of about 50, as a certain proportion between consistency of the lenticular nucleus and cortex might be a necessary condition or a favorable element for the supposed changes of tension. This theory would require changes of the spherical aberration of the eye during the hypermetropic condition which might be tested by aberroscopic investigations or Jackson's sciascopy with luminous point. R. thinks that these conditions are not very rare and often are overlooked. C. Z.

GLAUCOMA

AN OPERATION FOR GLAUCOMA—FILTRATION SECURED BY A LEECH-BITE INCISION.—TODD, FRANK C., Minneapolis (*Ann. Ophth.*, July, 1915). He devised a knife two years ago, the blade is set at an angle like a keratome and has two cutting edges on the flat and one in the vertical so that it makes a triangular incision

with three flaps. Such an opening does not tend to close readily. A conjunctival flap can be raised as in the Elliott operation or the point of the knife can be pushed through the conjunctiva above the cornea and carried down underneath the conjunctiva to the sclerocorneal margin and then forced into the anterior chamber. If the iris prolapses it is excised. He does not offer this operation as a substitute for trephining but as an adjunct thereto.

M. B.

CORNEO-SCLERAL TREPHINE AFTER THE ELLIOTT METHOD FOR THE REDUCTION OF INTRA-OCULAR TENSION.—HALLETT, DE WAYNE, New York (*Jour. Ophth. Otol. and Laryng.*, June, 1915). The history of twelve operations on nine patients is given in full that were operated upon by the Elliott method during a period of about a year. Six operations were for simple glaucoma, the average primary tension being 53 mm. Hg., and the post-operative tension 13 mm. Hg. In four cases of secondary glaucoma the average tension was 52 and the post-operative 16. In two cases of acute glaucoma an average primary tension of 60 became 26 mm. Hg. No return of increased tension has taken place in any of the patients during the short period they have been under observation.

M. B.

TREPHINING IN GLAUCOMA.—VAN GEUNS, J. R. (*Tyds. v. Geneesk.*, August 8, 1914). shows a patient, who for the first time was taken care of in 1904, when he was 41 years old; he had been suffering for 3 years with rainbow colors. Diagnosis: Glaucoma chron. Pilocarpin is prescribed. Not too much complaints up to 1909, when he returns with an attack of acute glaucoma. Iridectomy and piloc. afterwards. After recovery vision and field: N. Pupil remains wide through paralysis of the sphincter iridis. T.=N; no sign of glaucomatous excavation. The complaint of colors returns however after 3 months, mostly in the morning. 1, 5 year after the operation patient returns with a beginning central excavation of the right disc and somewhat higher T. Sclerotomy anterior. Half a year later again color rings, now also before O. S.; the right field is somewhat narrower at the nasal upper part. T. both eye: N. In November, 1911, iridectomy O. S. and sclerotomy anterior O. D. O. S. has remained normal since: V. with corr. 6/6, T. and F. =N, no excavation. The central excavation O. D. increases during the first months of 1913 and is total in June. Then trephining after Elliott with a one mm. trepan, the prolapsed iris is excised. Patient continued Piloc. another 2 months,

stops then. V. after corr. 6/6 f. F. = N. The excavation of the papillas disappeared for a time after the operation, when tension was distinctly subnormal. After T. has become normal a partly central excavation is present, which has not progressed and is much smaller than before the trephining.

van Genus and Hazewinkel have seen satisfactory results from the trephining, the best when combined with iridectomy. They use a one mm. size. v. G. then relates the case of a 12 years old patient, on whom he performed a trephining with peripheral iridectomy for glaucoma acutum O. S. on March 21. On April 6 the vision was suddenly diminished and a detachment of the retina was visible, circumscribed, but pretty large at the nasal side directly opposite to the trephine opening. The detachment began to be retrogress on May 2 and had disappeared on May 9. The V. is again as before. Discussion.

Rochat is in general very satisfied with the results of the trephining. However he saw a short while ago a patient on whom he had performed trephining for acute glaucoma: the ant. ch. did not reform, the post. surface of the cornea and the ant. lens capsule became slowly opaque, the V. diminished.

Wolff observes that Fuchs published two similar cases.

E. E. B.

JUVENILE GLAUCOMA.—HAAG, C. (From the eye clinic of Prof. G. von Schleich in the University of Tübingen, *Klin. Mon. f. Aug.* 54, p. 133), reports on all cases of juvenile glaucoma observed at the clinic, viz. 67 with 111 glaucomatous eyes. He thinks that by utilizing all cases of a uniform material which also contains cases without special peculiarities, a more correct picture of the disease is gained, than from a collection from literature, as e. g. Löhlein's (*v. Graefe's Archiv.*, 85, reviewed in *Ophthalmology*), since this is more apt to include curiosities, otherwise they probably would not have been published. The frequency with regard to age considerably deviated from the numbers of Löhlein. There was no essential difference with regard to sex and side. Juvenile glaucoma increases in both sexes with advancing age up to the 35th year. Other pathological conditions, especially general disturbances of nutrition were very frequent. Inflammatory was twice as frequent as simple glaucoma. 31% occurred in myopia, 17% in myopia above 6 D., 28% in hypermetropia. Hence a predisposition of hypermetropia to glaucoma does not exist, but to myopia. Deep anterior chamber was more frequent in simple than in inflammatory glaucoma. Flat anterior chamber was more frequent in inflamma-

tory than in simple glaucoma, and almost exclusively myopic eyes showed a deep anterior chamber. Hereditary elements were not more common than in glaucoma of adults. Congenital anomalies were frequently observed. From H.'s material no relations could be deduced, which justify the assumption of an essential difference of juvenile glaucoma from glaucoma of adults. C. Z.

EXPERIENCES WITH ELLIOT'S OPERATION IN GLAUCOMA.—LUNDGAARD, K., Copenhagen (*Klin. Mon. f. Aug.*, 54, p. 209), describes his technic of the operation and reports 40 cases in tabular form, which were operated upon in a period from March, 1912, to May, 1914, with records of the visual fields in 8 meridians. A regulation of tension was attained in 32 out of 40 eyes, but only in 28 the results were excellent. Iridectomy was performed in 23 and the tension was normal in 20. 13 cases were treated without iridectomy with regulation of tension in 8. In the favorable cases the tension remained normal and the visual field was improved. The clinical histories of 2 cases are given in detail, in which atrophy of the eyeball followed Elliot's operation, and of 2 cases of late infection.

L. considers Elliot's operation as a valuable addition to glaucoma therapy which is effectual and easy to perform, but not without danger. He saw in several cases increased tension subside spontaneously or under treatment with miotics without contraction of the visual field. The tension was from 30 to 35 mm. If the tension is not higher than this and if there are no other symptoms L. waits for considerable time until he advises the operation. If the tension is higher than 30 mm. and not influenced by miotics he operates in all cases of simple glaucoma even if the visual field is contracted and vision impaired, as he saw no unfavorable effect of the operation on the visual field. In secondary glaucoma (uveitis with increased tension) L. hesitates to resort to sclerectomy, since out of the few cases operated upon the 2 cases of atrophy of the globe can hardly be accidental. To avoid secondary perforation and infection L. recommends to make the conjunctival flap as thick as possible and to perform iridectomy. It prevents secondary prolapse of the iris, which favors perforation and must always be removed. C. Z.

REMARK TO LATE INFECTION AFTER TREPHINING.—AXENFELD, TH., Freiburg (*Klin. Mon. f. Aug.*, 54, p. 264), emphasizes that the danger of later infection after trephining for glaucoma must be taken very seriously. A. himself had 4 cases after blameless

operations and knows besides of the over 30 published, of more cases of other oculists and quotes the most recent literature. Although they are a comparatively small proportion of the great number of trephined cases, one must not forget that this complication may occur in persons, who so far have remained free from it. The term lasting result therefore is not admissible. Nevertheless A. regards trephining or sclerectomy as a necessary remedy in cases of severe chronic glaucoma, in which other methods failed or from our experiences will fail. Whoever suffers from this kind of glaucoma and is, if not trephined, threatened by more or less rapid blindness, must take this risk and soon. A. however denounces indiscriminate trephining of all eyes with increased tension, even with good function, or as a prophylactic. He calls attention to the importance of age, and thinks that trephining uncontrollable in its later sequels, ought to be considered at a youthful age only in cases, which cannot be preserved by other methods. A. maintains, that in spite of all these necessary limitations trephining or sclerectomy in proper cases is a valuable, not rarely the only remedy. C. Z.

HISTORICAL

AN OLD RECIPE.—DANIËLS, C. E. (*Tydschr. v. Geneesk.*, June 13, 1914), as librarian found in a manuscript of the year 1611 by M. Doctor Abraham van Broecke the following recipe: "No. 162. For the eyes so that you will not need spectacles. Take of a woman's milk, who suckles a son, three spoons, and the same son's piss, also four full spoons, the white of a fresh egg and of camphora a scruple, put these all together in a pot, let it become warm on a oven or fire, put herein some small linen napkins, lay these on the eyes, and let them lay there during the whole night: do this three times every quarter year once." E. E. B.

AN OLD BOOK BY ABRAHAM CAEN.—SCHOUTE, G. J. (*Tydschr. v. Gen.*, September 12, 1914), refers to a book printed in 1597 at Dordrecht by Abraham Caen. It is a translation by Carolus Battus of Guillemeau's *Traite des Maladies de l'oeil qui sont en nombre de cent treize, ausquelles il est sujet*. J. Hirschberg mentions only in his "Geschichte der Augenheilkunde" a translation from 1678 by Johannes Verbrigge at Jan Glaesz ten Hoorn.

The book is therefore the oldest Dutch translation of Guillemeau and also the oldest Dutch book of ophthalmology. The book of Verbrigge wants to make the impression of an entirely new elabora-

tion of the same French book: the title is slightly different from Battus', the preface contains new "dedications," a frontispiece is added and probably not without premeditation the name of Battus is nowhere mentioned. Between both impressions nearly a century has elapsed: and one is amazed to see that Verbrigge did not translate from the French, but verbally has copied Battus, with his mistakes.

To Battus the honor of having introduced the French ophthalmology in the Netherlands. This old translation shows again, what the historici have taught us, that in the middle ages the Netherlands chiefly looked for their scientific knowledge to the French. The work of Guillemeau is from 1585, the translation by Battus appeared 12 years later. An English translation came out in 1622, and a German one only in 1710. E. E. B.

INJURIES

HYDROPHTHALMOS FOLLOWING TRAUMA—REPORT OF A CASE.—McGUIRE, HUNTER H., Winchester, Va. (*Ophth. Record*, March 1915). The specimen showed a globe much enlarged in all diameters, the principal elongation being in its antero-posterior diameter, with a large globular cornea and a great attenuated sclera. A section of the eye revealed a fluid vitreous secondary, no doubt, to an existing chorioretinitis. G. I. H.

SERIOUS INJURY TO AN EYE FROM A BURSTING GOLF BALL.—ELLIOT, R. H. AND INMAN, W. S., London (*Brit. Med. Jour.*, March 20, 1915). The writers point out that this accident is not uncommon in America but rare in England: the bibliography appended contains the names of eleven American reporters.

The accident is due to the fact that the cores of golf balls are surrounded by machine-wound indiarubber ribbons, thus subjected to great pressure when cut open, the contained fluid is expelled with great force. The contents seem to vary. The liquid first used was water but this was supplanted by a heavier fluid. Analyses have shown such contents to consist, in some cases, of a mixture of barium sulphate, soap and a fine alkali, sometimes with the addition of 2 per cent of sodium hydroxide: in other cases dilute sulphuric acid, or a paste of chloride of zinc and soap, or a mixture of chloride of lime and soap, or a solution of chloride of zinc.

The accidents reported have all been due to the balls being cut open and not to their bursting during play. A review of the recorded cases shows the following points of interest: (1) The

damage done is of a very serious nature—in most of the cases the injured eye either became blind or vision was reduced to the power of counting fingers at a short distance. (2) A large percentage of the cases are in children or young people. (3) In at least two cases the victim was not the person who was opening the ball, but a child who was looking on.

The practical point is the consideration of preventive steps. Air and solid core balls are quite as effective as the dangerous fluid core balls; hence there is absolutely no excuse for the manufacture of the latter. Warnings have been issued against the dangerous practice of cutting open golf balls; such warnings should be widely and continuously repeated by medical men.

C. H. M.

NON-INDUSTRIAL INJURIES TO THE EYE.—GREENE, HENRY COPLEY, Boston (*Interstate Med. Jour.*, May, 1915). Among 2,330 hospital cases of ocular injury and ocular disease treated in three Boston hospitals during two years, 352 or 15.1 per cent., were cases of non-industrial injuries and their sequelae. These injuries were the most common difficulty treated, exceeding in frequency even industrial injuries which came second, with 11.2 per cent. of all cases.

96 per cent. of non-industrial injuries involved only one eye. But the single eye, or the more seriously involved of two eyes, became totally blind in 29.5 per cent., practically blind in 62.9 per cent., and incapacitated for highly skilled work in 78.3 per cent. of the cases. While non-industrial accidents, then, are almost exclusively a one-eye trouble, we find them outranking all other diseases in their virulence of attack. In the proportion of our total cases of one-eye disablement for which they are responsible, they similarly outrank all other diseases. Total blindness of the worse eye is the typical result (29.5 per cent.), with vision between fingers at 3 ft. and light perception (25.0 per cent.), a close second.

83 per cent. of all the cases of non-industrial injuries occurred in men and boys. Such injuries occurred but seldom in infancy, but are noticeable between two and four; they are highly prevalent between five and fourteen, especially subsequent to the tenth year; from fifty to seventy these accidents are again very frequent.

Recoveries were less frequent after than before twenty and less frequent after forty-nine than in the twenty years preceding; they also show that practical blindness of the injured eye results far more often after twenty than before, and that the periods between twenty and thirty and after fifty present the worst results of all.

The injuries were, as a rule, monocular. There is some reason

to believe that popular education may reduce both their prevalence and the serious results; people of native, English-speaking stock were less often involved than the non-English-speaking population. "However this may be, any less serious results among American than among foreign patients is doubtless due in great part to prompt and adequate treatment—a fact which suggests that the damage now done may be reduced by a campaign of education among our population both of native and of foreign birth. That such education is of prime importance becomes still more clear when we remember that non-industrial injuries combine with other injuries and with diseases of the eye to produce almost 10 per cent. of our binocular disablement for skilled trades, and more than 10 per cent. of our binocular practical blindness." C. H. M.

THE PSYCHOLOGY OF TRAUMATIC AMBLYOPIA FOLLOWING THE EXPLOSION OF SHELLS.—PARSONS, J. HERBERT, London (*The Lancet*, April 3, 1915). The writer alludes to the frequent reports of amaurosis and amblyopia resulting from the shock of explosion of shells in the present war and refers to the description and investigation by Myers. He gives the history of a typical case as follows:

A man, after more or less prolonged fatigue, is incapacitated by the explosion of a shell in his immediate vicinity. He may be merely knocked down or more or less seriously injured by concussion, shrapnel bullets, or shell splinters. Consciousness is lost for a variable time, but often not so far as to prevent automatic movements, so that the man may walk in a dazed condition to a dressing station. The mental equilibrium at this stage is much disturbed, and all memory of this phase is usually lost. The most striking feature of the case is that the man is instantaneously struck blind. The blindness may be associated with deafness, loss of smell, and loss of taste, but all these are less frequent than the blindness. On examination it is found that there are intense blepharospasm and lachrymation. The lids are opened with great difficulty and examination of the eyes is almost impossible. In the course of a week or two the blepharospasm diminishes and it becomes possible to examine the fundi. Of course, there may be local injury to the eye, but in uncomplicated cases the eyes are found to be normal. The pupils react to light, though in some cases the reactions are sluggish, and sometimes one pupil differs from the other, being larger, or more sluggish in its reactions. The fundi appear to be absolutely normal. By this time probably some restoration of sight has occurred. Light is perceived and large objects may be distinguished.

As improvement occurs the patient manages to grope about, usually with his hands outstretched before him, but it is noteworthy that he does not usually stumble up against objects in his path. As soon as it is possible to take the fields of vision it is found that they are markedly contracted, and that indeed to a degree which seems scarcely consistent with the avoidance of obstacles in walking. The recovery of vision is slow, but eventually it seems always to be complete. It may recover to the extent of having only a central scotoma, though this may reduce the visual acuity to 6/60 or less. By perseverance and encouragement the patient may be induced to read a few lines of the types.

Though there are suspicious symptoms in many cases and some show a disinclination to return to duty and in all there has been complete mental upset, sometimes with hysterical symptoms, it is not justifiable to jump to the conclusion that there is shamming. It is necessary to segregate these cases from allied conditions due to organic lesions or to malingering; it is not always easy to eliminate lesions causing retrobulbar neuritis and still less easy to exclude malingering.

These cases may be regarded as examples of injuries or wounds of consciousness. This does not imply that there is no neural lesion to account for the psychological disorder, but merely that it has hitherto escaped observation. The disorder of the conscious processes varies with the nature and severity of the injury and with the organization of the individual's character. The writer then enters into the question of evolution of character, guided chiefly by the deductions of such writers as C. Lloyd Morgan, J. Mark Baldwin, and William MacDougall, mental evolution being divided into three stages which may be called the sentient, the conscious and the ideational. Though in the cases under special consideration there can be little doubt that the early loss of vision has a definite neural basis, it must be conceded that in the later stages the neural basis is of that undefined nature which we associate with so-called "functional" conditions. In other words, it is neurotic, but it is not "shamming," difficult though the line be to draw between them.

C. H. M.

FACE POWDER CONJUNCTIVITIS.—BLACK, NELSON M., Milwaukee (*Ann. Ophth.*, July, 1915). A form of conjunctival irritation seen in women only. Symptoms, frequent blurring of vision, near work causes annoyance, severe itching of lids, slight rubbing of lids causes bulbar hyperaemia. Some cases have oedema of the lids. The secretion is mucilaginous and variable in amount, micro-

scopic examination shows epithelial cells and in their midst or surrounding them are found masses of what appear to be pentagonal shaped crystals, the majority having a central black spot. In a few cases there were many fine amorphous crystals disseminated throughout the mass of epithelial cells and pentagonal crystal-like bodies. There were no microorganisms. Slides were given to Dr. C. H. Bunting for examination. After an examination his opinion was that the crystals were starch granules. All the patients with these symptoms were using Roger and Gallet's face powder and an analysis of the face powder showed the same crystals. The author thinks the use of a powder-puff causes a dust to rise which gets into the patient's eyes. Where the powder is applied with a chamois skin no dust arises and the symptoms do not occur.

The condition is quickly relieved by flushing the eye with normal salt solution and the use of an ointment composed of equal parts of lanalin and petrolatum.

M. B.

AN UNCOMMON OF WOUND OF THE OPTIC NERVES.—VAN DER HOEVE (*Tyds. v. Geneesk.*, August 8, 1914), relates the following rarity.

On May 14 a 28-year-old man came in the dispensary with the story that he had been wounded 4 days previously with a knife below O. S. He had lost consciousness for a few moments, had vomited and had lost some blood through mouth and nose. When he had regained consciousness he could not see, later V. O. S. had returned.

A little inside from the vertical through the external eye angle a 2 mm. long horizontal, partly closed, granulating wound was present, which secreted much pus and could be probed toward the nose for some centimeters. Much edema prevented good observation of the underlying bone. O. S. was normal, only the motion downward somewhat restricted through the swelling. Ptosis O. D.; only lifting through exertion of the M. frontalis. The eye was immovable, absence of pupillary reaction and acc., no vision, the cornea was nearly insensible, while the surrounding showed normal sensitivity. Exophthalmus of 2 mm., disc hyperaemic vessels much tortuous. The swelling was so reduced after a week that a rough swelling of the bone extending until the zygomatic extension of the sup. maxilla, could be palpated; probing gave an impression of denuded bone. The diagnosis was made of: Cut wound with fracture of the left os zygomat., complicated with a fracture of the base of the skull or fracture of the left orbital wall, going through the fiss. orbit, sup. and foramen opt. destructing

there the optic nerve and the motor nerves, pressing the N. trigem. The hyperaemia in the fundus and the protrusio were explained through a hemorrhage in the sheaths of the O. N. and in the orbit.

When however a roentgenphoto was taken a knife-blade more than 8 cm. long was found within the skull cavity. The blade reaches from the left Zygomatic region until the middle of the right orbit. Large force was necessary to dislocate the blade, which sat tied in the bone; it was 2 cm. broad and 8.7 cm. long. From the known distance of the roentgen tube and the zygomaticum to the plate the localization of the point of the plate can be computed, which is about 5 cm. deeper than the zygomaticum which is in a full-grown skull about the distance to the foramen opt. and the fiss. orbit. sup. The knife probably directly has cut the nerves. Rhinoscopia anterior had not shown the knife; a complete nose examination could only be done after the extraction and did not show wounds. The papilla O. D. slowly became atrophic, the exophthalmus diminished, the eye deviated slightly out and downward. The wound after extraction healed quickly; locally a large callus remained of the broken zygomaticum and proc. jugular.

A similar traumatism of the eye of the not wounded side with the presence of the cutting object, has not been established before.

E. E. B.

TWO CASES OF INJURIES OF THE OPTIC NERVES.—TRESLING, J. (From the eye clinic of Prof. J. van der Hoeve in the University of Groningen. *Klin. Mon. f. Aug.*, 51, p. 188). A man, aged 23 was stabbed by a knife under the left eyebrow, going along the posterior surface of the upper lid through the sclera into the lower lid with resulting atrophy of the eyeball. The right eye protruded was immovable, and showed ptosis, ecchymoses of both lids, and subconjunctival hemorrhages. The pupil was wide and did not react. The optic disc was indistinct, the blood vessels enlarged and dark, cornea and supraorbital nerve anesthetic. Half a year later the anesthesia of the 5th nerve had subsided, but the cornea was still anesthetic. The upper lid could be raised a little by the levator. The pupil was immovable and the optic disc atrophic. Examination with Roentgen rays was negative. The affection apparently was due to a large hemorrhage, perhaps caused by a fracture at the optical canal.

Case 2. A sailor, aged 28, was, 11 days previously, stabbed with a knife below the left lower lid and bled from nose and mouth. V. L. 5/9. The right eye was blind and immovable, showed ptosis, exophthalmus. Pupil wide, did not react. Optic disc hyperemic,

intense venous congestion, vessels tortuous, cornea hypæsthetic. On the 2nd day after admission, i. e. a fortnight after the accident Roentgen rays revealed the point of the knife in the skull from which it was extracted. It was rusty, 19 cm. long and 2 cm. wide. It had entered the left zygomatic bone below the orbital margin without injuring the infraorbital nerve and went through the left middle turbinate, nasal septum and right lamina papyracea to the optic foramen and the superior orbital fissure. 30 days after the injury the ptosis had subsided and the motility of the right eye had somewhat returned. The eyeball was displaced forward outward and downward, the cornea remained anæsthetic. C. Z.

TWO CASES OF LESION OF THE 5TH NERVE BY PROJECTILES.—
 UTHOFF, W., Breslau (*Klin. Mon. f. Aug.*, 54, p. 394). A man, aged 29, was struck by a piece of shrapnel shell, which entered the right temple and lodged in the region of the right Gasserian ganglion, as the Roentgen skiagraph showed, injuring the first and second branches of the 5th nerve and causing relative functional disturbances of the 3rd branch. The man recovered, but an irritability of the right eye for external influences remained, responding with pericorneal injection and transient epithelial erosions in the lower portion. The sensibility in the whole region, supplied by the 1st and 2nd branches of the 5th nerve, the sense of smell on the right side of the nose, and the taste on the right side of the tongue were diminished. Emotional crying on the right eye was abolished. U. attributes this to a lesion of the secretory fibres of the facial nerve which very likely pass through the nervus petrosus superficialis major and the ganglion sphenopalatinum into the 5th nerve. Occasionally the patient complained of flying heat to the head, vertigo, and nausea. The sympathetic nerve was not affected.

Case 2. Isolated injury by infantry bullet of the 2nd branch of the left 5th nerve with amanrosis of the left eye. The bullet penetrated the left orbit of a student, aged 21, from close behind the external upper margin, grazed the posterior inferior segment of the globe with severe secondary intraocular changes, and damaged the 2nd branch of the 5th nerve in the lower portion of the orbit. Then it passed through the nasopharynx from above downwards and came out at the lower right side of the neck, entered a 2nd time below the right clavicle and became lodged under the right pectoralis muscle. The scar of the entrance wound was so slight, that at first it was not recognized as such, until the examination with Roentgen rays cleared the whole mechanism. The anesthesia was sharply limited to the region supplied by the 2nd

branch, the mucous membrane of the left side of the nose and of the hard palate. The sensibility of the upper lip, tongue and cornea was intact, also the sense of smell and taste, and the secretion of tears.

This speaks against the opinion of some authors, that the secretory fibres of the lacrimal gland arise from the 2nd branch of the 5th nerve and course through the nervous subcutaneous malae to the lacrimal gland. The left eye was blind, excepting slight perception of light excentrically outwards. The direct reaction of the pupil to light was abolished, the consensual was preserved. The optic disc was faintly visible and voluminous hemorrhagic bands extended from it into the vitreous. A white mass spread towards the temporal side and more to the periphery the chorioid and retina showed atrophic and intense pigment changes. Apparently these were due to the violent contusion. There was no sign of a perforation of the sclera.

C. Z.

INJURIES OF THE EYES BY INDIRECT, AND ARTILLERY, PROJECTILES DURING THE GREEK-TURKISH AND GREEK-BULGARIAN WARS.—COSMETTATOS, G. F., Athens (*Arch. f. Aug.*, 19, pp. 29 and 39), reports on 35 cases of injuries by stones and 4 by wood hurled against the eyes through artillery projectiles hitting the soil, rocks, walls, etc. If only the surface of the eye was struck, the injuries were slight, but if the stones penetrated deeper into the eye, the lesions were much more severe: Iridocyclitis, injuries of the iris and lens, and caused partial loss of sight in 8, total in 4 cases. In all 4 cases of injuries by pieces of wood the sight was partially lost. By rigorous antiseptis infection was almost always prevented.

Out of 29 eye injuries by grenades 10 had partial loss of sight, viz. 8 injuries of the cornea, 1 of the iris, and 1 of the ciliary body, and 7 total loss of sight: 2 injuries of the cornea, 1 of iris and ciliary body, 1 hemorrhage of the vitreous, and 3 eyes were totally crushed.

4 cases of injuries by shrapnel bullets are reported: severing of the optic nerve, 2 hemorrhages of vitreous, rupture of the sclera with atrophy of the eyeball, with total loss of vision.

C. Z.

OPHTHALMOLOGICAL OBSERVATIONS FROM THE FIELD OF WAR.—SPIRO, Berlin (*Centralbl. f. Prakt. Aug.*, 39, p. 49), gives a very interesting report of his activity at the front. In contusions by pieces of ground Berlin's opacity was never lacking. Intraocular hemorrhages deserve attention, as transportation proved harmful.

while by rest in bed and compression bandage even severe cases healed. Later on subconjunctival salt solutions gave good results. Wounds and ulcers of the cornea healed best after being covered with conjunctival flaps according to Kuhnt. In shots of the skull, especially tangential shots, choked disc compelled to operation, after which it soon subsided. In December quite a number of cases of hemeralopia occurred due to general exhaustion. The electric ophthalmoscope proved very useful. The supply of spectacles was very important. C. Z.

INSTRUMENTS AND METHODS OF EXAMINATION

CAREFUL HISTORY TAKING WITH A TYPE OF EYE HISTORY CARD.—KRESS, GEO. H., Los Angeles, Cal. (*Jour. Ophth. and Oto-Laryn.*, February, 1915). The card is an excellent one for the man that desires minute data in every case but seems too elaborate for practical purposes of the busy specialist. G. I. H.

THE LIMITATIONS OF THE TONOMETER.—SMITH, PRIESTLEY, Birmingham, Eng. (*Oph. Rev.*, March, 1915). The writer calls attention to the fact that there are other factors besides intraocular pressure which influence the impressibility of the eyeball and hence the accuracy of the readings with the tonometer: these factors are the size and structure of the eyeball. Eyes with the same pressure will sometimes give different readings and eyes with different pressures will at times give the identical readings.

In order to answer the questions: (1) With what degree of accuracy can we measure the impressibility of the eye? (2) With what degree of accuracy does the impressibility indicate the intraocular pressure? He conducted a series of experiments chiefly on human eyes postmortem, but also on excised eyes of sheep and bullocks. He demonstrates that the reliability of the readings taken with the tonometer of Schiötz depend greatly upon the position of the instrument—whether this was exactly on the summit of the cornea and perfectly vertical: he gives diagrams showing the correct position and also several possible faulty positions of the eye and instrument and illustrates how each of these vitiates the results of the readings.

He contends that in recording the tonometric observation, the reading and not the supposed equivalent should be given: the former is fact but the latter is an inference and this inference may be more or less correct. He criticizes the statement that the pressure in healthy eyes varies from 13 to 27 mm. of mercury as being

most unlikely since it implies that the pressure of the intraocular fluid and that of the blood in the retinal and uveal veins is twice as great in some eyes as in others within normal limits. Since we find that the pressure in different normal eyes seems to differ by 8 or more mm. of mercury as measured by the tonometer and yet know that in reality there is no difference in pressure whatever, we are certainly justified in doubting the inference above alluded to.

"We are told that when the tonometer indicates an intra-ocular pressure of more than 27 mm. Hg., the presence of glaucoma should be suspected. Also that glaucoma may co-exist with a pressure of 21 or 22 mm. Hg. These are inferences. If we want the facts we must re-translate the figures. *Then* the statements are that a reading smaller than 2.5 should be regarded as a danger signal, and that glaucoma may be present even with a reading of 4. These data, if confirmed, are very valuable; the original statements are dubious pathology. No doubt some eyes are damaged by degrees of pressure that others can tolerate with impunity, but the tonometer cannot tell us what these risky pressures are."

He is careful to indicate that he does not regard the tonometer as a useful instrument: though the Schiötz tonometer cannot measure *absolute pressure*, it can indicate *change of pressure* with great precision. Applied to the same eye at different times, e. g., before and after an operation, before and after the use of a certain drug, at different hours of day or night, and so forth, it can give invaluable aid in determining the occurrence of pressure changes when these are doubtful. Again, as between the two eyes of the same person, when these are presumably alike in structure, it may be relied on to detect with certainty a *difference of pressure* much smaller than is discoverable by the finger.

The smallest difference which the tonometer can be relied upon to detect depends on the skill of the operator and the amenability of the patient. However, even with the limitations necessary on account of the influence of structural differences in eyes, the tonometer is far more trustworthy than the finger as an index to the intra-ocular pressure, for its limitations apply also to the finger test, and it has no prejudices. To emphasize the importance of recording readings and not supposed equivalents, he points out that Schiötz himself has set the example of so doing. The chart is valuable as showing approximately the average value of any given reading, but not as a guide to the actual value in an individual case. This article is not an attack on the Schiötz tonometer, but rather a defence of an admirable instrument against demands with which no instrument can possibly comply.

C. H. M.

SOME CONVENIENT STEREOSCOPIC FIGURES.—SHAHAN, WM. E., St. Louis, Mo. (*Amer. Jour. Ophth.*, March, 1915). The writer describes some simple and easily made stereoscopic figures for testing stereoscopic vision in children. The figures used can be easily obtained at various paper stores, as for instance the Denison Manufacturing Co. They come in the form of gummed seals of various sizes and numerous multi-colored designs; some are Christmas and New Year seals, some are fantastic Halloween designs, such as hearts, stars, flags, etc. With a collection of these a number of stereoscopic charts can be constructed that will excite interest and co-operation, and elicit stereoscopic vision if the patient has any. The following directions are given for the construction of these charts:

"Have a number of blank cards cut of a size that will fit into the holder of your stereoscope. Through the center of each of these draw a vertical line. On either side of this vertical line draw three parallel lines, one 30 mm. from the central line, another 33 mm. from it, and the last 36 mm. from it. There will then be three pairs of parallel lines measured from the central line, the outer pair will be 72 mm. apart, the middle 66 mm. apart, and the inner 60 mm. apart. Six identical seals are used for each chart: two of them are placed over the outer lines, two over the middle ones, and two over the inner one, each pair being on the same horizontal line. The seals will then be respectively 72, 66 and 60 mm. apart in horizontal lines. When these, arranged in this way, are observed through the stereoscope by a patient with binocular vision, the seals farthest apart will appear largest and farthest away from the patient, while those nearest together will appear nearest the patient and smallest. The intermediate ones occupy an intermediate position. In using these tests with children, simply direct questions should be asked: "Which is the farthest away?" "Which is the closest to you?" "Which is the biggest?" "Which is the littlest?" "Is the top one straight over the bottom one, or a little to one side?" The answers to these questions will indicate definitely whether the patient has or has not stereoscopic vision."

C. H. M.

AN ACCURATE METHOD TO RECORD THE SIZE OF LESIONS IN THE OCULAR FUNDUS.—LUEBDE, W. H., St. Louis (*Amer. Jour. Ophth.*, June, 1915). The writer sets forth the advantages of the Gullstrand ophthalmoscope (Zeiss), and gives a preliminary report of the use of a micrometer scale attachment. The scale consists of 8 mm. divided into 0.1 mm. spaces. It can be attached perma-

nently in one of the oculars, or better still, to a tube fitted to slide into the ocular so that it can be removed at will.

"The greatest value of this new method is not the possibility of determining the size of fundus lesions in fractions of millimeters or inches, but in recording that size by a fixed scale under conditions which can be duplicated. Thus any appreciable change in the size of a spot in the fundus in a given case can be detected by a measurement made under the same conditions, months or years after the first measurement."

J. M. W.

THE VALUE OF THE OPHTHALMOMETER.—MUNSON, EDWIN S., New York (*Jour. Ophth. Otol and Laryngol.*, June, 1915). The author believes the instrument is of value. To get the most out of it, it should be used before the trial lenses. It then gives a guide to the axis and the amount of the astigmatism. He has observed that in the absence of hyperopia or myopia the ophthalmometer over-corrects nearly double. In high degrees of hyperopia the astigmatism is sometimes slightly less than half. In high degrees of myopia it is more than half, sometimes as high as the total reading. He does not believe that when the astigmatism is against the rule that it is unnecessary to deduct from the ophthalmometer reading. Our experience has been that the greater the astigmatism the less deduction it is necessary to make from the ophthalmometric readings.

M. B.

DEMONSTRATION OF AN INSTRUMENT FOR DIAGNOSING ANOMALOUS COLOR-PERCEPTION.—ROCHIAT, G. F. (*Trds. v. Genesck.*, Aug. 8, 1914), refers to his communication in the foregoing meeting. The instrument consists of two prismatic troughs, which are pushed along each other by a cogwheel and pinion through turning a knob, so that every moment the thickness of the fluid layer can be read. The basins stand on a table before a screen, in which changeable openings through an iris diaphragm. Through this opening the light of an Auer-lamp is thrown, which is diffused through a lens and a dull glass. The examined person sees an illuminated disc in the bowls through the fluid filter, which he must try to make as white as possible by turning the knob. The color filter contains 200 cub. c.m. water, to which is added 6 cub. c.m. of a 1% methylgreen solution, and 3 cub. c.m. of a saturated solution of pyoktanium aureum. Addition of 5 drops vinegar will conserve the fluid for some weeks. Slight changes in the relation of the colors is needed for other light sources.

Discussion.—Waardenburg asks if it would not be advantageous

for non-intelligent persons to let them compare the color they observe with standard colors, and if it is possible to make out the form of color blindness. A true dichromat, whom he examined, never saw a distinct color, but a lighter or darker surface, when it was green or red.

Rochat has found his instrument very handy for non-intelligent people, who give right answers. If no red is seen then the patient has a decided shortening of his spectrum to the red side.

E. E. B.

OPTICAL PROPERTIES OF JODIUMGREEN.—ROCHAT, G. F. (*Typds. v. Geneesk.*, Feb. 21, 1914), mentions the difficulty for getting a real green color. By looking against the light one can see the blue which passes through. Solutions of anilin dyes, as f. i. jodiumgreen, let red pass in large amounts. Examined with the spectroscope the transmitted light, in not too concentrated solution, contains green, blue, red and yellow. This yellow disappears in stronger concentration. The transmitted red is a small band to the left of the lithium line, at about the Fraunhofer line B., very luminous; it is practically monochromatic. Change in concentration only changes the intensity of the red.

The blue may be made to disappear by adding to a concentrated solution of jodiumgreen sulphuric acid or some other strong mineral acid. This transforms a part in a strong yellow substance, which in sufficient concentration destroys the blue. The remaining fluid shows spectroscopically only the external red and the green to the right of the thallium line, which are complementary colors. If the concentration of the fluid increases red and green become weakened, but not in equal degree; the green disappears first; at the end the fluid becomes entirely red, in the color of pure spectral red. As this red and green are complementary it is easy to produce white. The demonstration is easier, when the fluid is put in two prismatic glass trays, which form a parallelepiped by shoving the one over the other. A layer of fluid can so be found, where the white is the purest.

With this white the resorption in the yellow spot can be demonstrated. When with central vision pure white is seen, then green is seen by looking slightly sideward. To the contrary, if white is seen with a slightly peripheral to the macular part of the retina, then central fixation will be distinctly red. This can only be explained by extinguishing of the blue-green light by the macular pigment.

This color filter is also a good way to detect anomalous trichro-

masia. Normal persons give nearly the same result. The difference for 21 persons was not more than one mm. when the thickness of the fluid was measured through which the light was seen. Persons with inferior color sensation give a deviation of many mm. from the normal, and their white seems for the normal strongly green or red. Among elderly persons many green anomalies are found, probably the result of absorption at the yellow spot and of the senile lens. But their judgment regarding green and white deviates so much with that of normal young people that the question arises how far these old people are trustworthy in occupations where under difficult circumstances signals must be recognized.

Discussion.—Schoute considers it an advantage that the examined person looks at a round light. It appears clearly from the paper that not only dichromates but also red and green anomalies must be rejected for naval service.

Rochat found half of the examined people above the age of 50 green-anomalous.

E. E. B.

THE HEMIOPIC PUPILLARY REACTION AS DIAGNOSTIC HELP.—(Illustrated.)—VAN BOUWDYK BASTIAANSE, F. S. (*Tyds. v. Geneesk.*, April 11, 1914), describes the instrument used in the psychiatric-neurologic clinic in Utrecht. The objections against the original genial instrument of C. Hess are that the light stimuli of the slits are often insufficient with patients with low irritability to produce a reaction and the observation of the reaction is pretty difficult on account of the small quantity of light and the nearness of the instrument. The instrument in the clinic is made after the principle of Behr. The two electric lamps are so connected that one lamp is turned up and the other out by the same motion. The instrument can be moved around, is handy for demonstration and the switcher has the form of a pear as used for electric bells, which does not need fastening to a table or such. The lamps can be moved in all directions. According to the irritability of the retina lamps of 10, 16, 25 candles can be put in. The patient in bed can also be examined. It also contains a bar with plummet for fixation of the patient and to bring the eye in the middle of the two lamps. With this instrument the reaction can be demonstrated at distance, the consensual reaction be observed (with bitemporal reaction behind the hand), and the narrowed pupil be photographed. Follows the history with illustrations of the patient described by De Kleyn in the *Arch. f. Ophth.*, Bd. 80 Hft. 2. The 16 candles metal wire lamps were used to photograph the hemianopic pupillary reaction. V. B. B. could demonstrate this phenomenon, now homonymous, in a patient

where the clinical diagnosis was made of tumor originating from the small wing of the sphenoid. The patient could be examined binocularly.

The hemiopic reaction can be found with simple means, enables to distinguish central hemiopia from hemiopia through interruption in the optic tract, which has the advantage of objectivity against the visual field determination, and can be done with somnolent persons and little children. The future must teach in how far the phenomenon will be of help in affections present between the splitting off of the pupillary fibers from the optical tract and the oculomotorius nuclei, without visual disturbances, and if in beginning affections of the optical tract quantitative diminishing of the irritability of one of the retinal halves can be present before the narrowing of the field.

E. E. B.

LACRIMAL DISEASES

TOTI'S OPERATION FOR DACRYOCYSTITIS WITH THE REPORT OF TWELVE CASES.—RALA, V. L., Providence (*Ann. Ophth.*, July, 1915). The operation is called dacryocystorhinostomy. It consists in resecting the cresta lacrimalis, the lacrimal bone, the floor of the lacrimal sac and a corresponding piece of nasal mucoperiosteum. This is all carried out through an incision through the skin made in a curved manner about 3 mm. in front of the attachment of inner palpebral ligament. The author reports 12 cases upon which he performed this operation. All except one were cured.

M. B.

OPERATIVE TREATMENT OF CHRONIC TEAR SAC DISEASE.—ROCHAT, G. F. (*Tyds. v. Geneesk.*, Aug. 8, 1914), gives a preliminary report of operations for deep seated stenoses, where long continued conservative treatment had not given the desired effect. Seven patients were operated upon, five were cured, two not. The operation of West and Polyak belongs to the domain of the rhinologist, needs a special instrumentarium and great dexterity; is difficult and lasts long; can, therefore, in general not take the place of the probing, but should be tried for cases which were hopeless until now.

Discussion.—De Kleyn thinks that the danger remains with the operation of West as well of Toti, that the opening in the bone closes quickly, because it shrinks quickly. A second objection is the danger of conjunctivitis, when coryza is present. A third objection regards the place of the stenosis. If this is very low it is

better to open the duct. lacr. from out the nose and so remove the stenosis. He had done this four times. One failed, the others succeeded after application of Koster's probe after removal of the stenosis.

Rochat considers it a disadvantage of Toti's operation that the tear sac is opened twice, while after West only one perforation is made. The last one also leaves no scar in the face. The practical danger for coryza seems to be not so great. West mentions only one case. Benjamins and speaker did not see these consequences. On hard pressing sometimes air and mucus would escape through the lacrymal points in the conjunctival sac, however without serious consequences. It is difficult to decide, if the stenosis is very deep or less deep, and therefore it is difficult to use this as an indication for the one or the other operative method. West only operates after his method, when the stenosis sits beneath the passage of the tear sac in the nasal canal.

De Kleyn: When Toti's operation is done after the flap method, modified by Struycken, the tear sac is only once perforated. But also here the opening closes in the long run.

Rochat thinks that the closure can be long postponed. West mentions cases which remained well two years.

Benjamins says that the opening in the nasal wall must be made large. He also finds it difficult to determine where the stenosis is located.

Snellen says that if one uses instead of the straight probe one with olive form knob, the place of the stenosis can be decided.

Marx asks if nasal complications arise after the operation.

Benjamins: The after treatment means long repeated touching with arg. nitr. and syringing through the lacr. points with boric acid sol. The patients have no trouble from the communication between tear sac and nasal cavity.

E. E. B.

OPERATIVE TREATMENT OF CHRONIC OCCLUSION OF THE TEAR DUCT.—BENJAMINS, C. E., and ROCHAT, G. F. (*Tyds. v. Geneesk.*, Nov. 28, 1914), report the results of seven cases (later augmented with three), operated after the method West-Polyak. They found the narrowness of the entrance to the place to be operated upon sometimes created through a slight curving or thickening of the septum or of the mucous membrane over the tuberculum septi, which, however, are not enough to need special operative interference. Helpful is pushing aside the mucous flap; once they followed Halle's method, pushing backward the flap, which is made lower. The bleeding may give trouble, as the tear sac with its wide

blood vessels in its wall becomes uncovered. Time requiring tamponade is the only expedient. The excision of the uncovered tear sac is mostly difficult. One must look out not to damage the outer wall of the sac. Polyak's way of pressing the sac with the finger towards the inner canthus may do damage. The sensibility of the sac is great. Tamponade with 20% cocain with adrenalin in the nose and for the last three patients a 1% novocain solution from out the nose in the sac after removal of the bony wall gave satisfaction. West's localization of the so-called torus lacrimalis as orientation point for the tear duct led in one case to a place one-half centimeter before the tear sac. With the exception of one case, the anterior ethmoidal cell had to be opened. Only once a diseased ethmoidal bone was found. The condition of the puncti and canaliculi lacrimales needs care; too large splitting should be prevented. Tamponing after operation is only done to keep in place the mucous flap. In a narrow nose to prevent synechia (growing together) a thin mica disc is put against the septum. After opening of the sac the chronic dacriocystitis must be treated; syringing with boric acid solution through the punct. lacr. and touching with 2/10% sol. arg. nitr. from out the nose. Two patients had air passing through with blowing the nose, without particular discomfort. With lupus nasi or ozaena the operation should not be done on account of danger for infection for the eye. Five of the seven operated cases were successful (the three later referred to above were of too short duration; were so far also successful). One of the unsuccessful cases needed after-treatment for granulation formation at the sac opening, but patient stayed away. The second unsuccessful case had the lower canaliculus lacr. entirely slit and the upper one nearly closed.

The writers intend to continue this course. In the literature the average percentage of cures is 90%. We should try to find out the cause of the failure in the remaining 10%.

A. S. Jacobson writes in the following number of the journal that he has performed fifteen operations of this kind and that f. i., the narrowness of the entrance through a bent septum can be overcome first by performing a submucous resection after Killian; it can be done in the same sitting. He had never had any trouble to stop the bleeding while uncovering the tear sac, while he considers the pain which patient complains about the result of insufficient anaesthesia. The field for operation becomes bloodless and insensible by injecting 1% novocain-adrenalin sol. endonasally from the margin of the apertura pyriformis subperiostally under the tear sac and its surrounding protecting the bulb and the canaliculi lacr. with the

finger. He only found twice an ethmoidal cell in his fifteen cases. Recidiv of the epiphora appeared, when the opening in tear sac and os lacrymale closed through granulations; removal restored the tear passage toward the nose. A pretty long after-treatment with lapis or nitr. arg. to check the granulations, until the wound is covered with epithelium is necessary for success. E. E. B.

ARGYROSIS OF THE LACRIMAL SAC.—VON SKRAMLIK, E., Freiburg (From the eye clinic of Prof. A. Elschmig, in the University of Prag. *Klin Mon. f. Aug.*, 54, p 443). A woman, aged 59, instilled a 1% solution of argentum colloidal into the right eye for seven months; in the first three weeks daily, and then occasionally. There was a marginal torpid ulcer of the cornea, intense greyish violet discoloration of the whole conjunctiva, and blennorrhoea of the lacrimal sac. A probe could not be introduced into the duct. The tear sac was extirpated, fixated in celloidin, hardened in alcohol, cut in series and stained. The microscopic examination showed the typical picture of chronic dacryocystitis and two different changes caused by the deposit of silver: a diffuse light brown coloration of the subepithelial fibres of connective tissue and numerous grey or black more or less fine granules, almost exclusively intracellular or on the elastic fibers in the subepithelial and deeper portions of the wall. Both were dissolved by a 5% solution of cyanide of potash, which proved that the diffuse impregnation and the granules in the cells were combinations of, or amorphous, silver. It is a well known fact that the local application of the more recent silver salts, especially protargol and argyrol, soon lead to argyrosis. This is readily conceivable as the easier a silver preparation penetrates into the mucous membrane, the sooner silver is deposited in the tissue. Thus the greatest number of recently published cases of argyrosis was brought about by argyrol. The histological changes seem to be identical in all silver preparations. Apparently a certain final product (metallic silver) is deposited in the tissue. The case showed again that no silver preparation ought to be instilled into the conjunctival sac for any length of time without constant control. C. Z.

LENS

CHRONIC INFLAMMATIONS OF THE EYE THROUGH FREE LENTICULAR MASSES IN EYES OF OLD PEOPLE.—STRAUB (*Yds. v. Geneesk.*, Sept. 5, 1914), states that it is well known that the lens-mass, which is absorbed slowly in young people in traumatic catar-

act, does not irritate, while lens-mass in elderly people produces a reaction, seen as well in accidental traumatism as in cataract-operation. In people of 80 and older the lens is removed entirely, which makes the after-treatment so favorable. They can be discharged after fourteen days and the movable tremulant iris shows that no synechiae have formed with the lens capsule, while to the contrary a tremulant iris after extraction in 70 years old people is an exception. We may, therefore, accept that the substance of senile cataracts irritates, is an inflammatory stimulus. Straub has good reasons to suspect that the senile non-cataractous lens has the same property. There exists less occasion to get certainty: cases of dislocation lentis through blunt traumatism in old people, which nearly always lead to destruction, may help to form an opinion. Next are the cases of traumatic cataract in old people, which show without exception severe inflammatory symptoms and are lost if one does not succeed in removal of the wounded lens by operation. The significance of the senile lens is still more apparent, when the vulneration of the lens has remained unobserved for some time. One has than thought for weeks or months to treat a chronic inflammatory process following infection, and detects only later, even after enucleation, that a wound of the lens capsule and slowly progressing resorption of senile or cataractous-senile lens mass has been the cause of the invain combatted inflammatory phenomena. Straub gives some case histories and shows histological findings. In chronic inflammations in eyes of old people the possibility should be suspected of possible resorption of lens-mass.

E. E. B.

SHAGREEN OF THE HUMAN LENS AND SHAGREEN GLOBULES.—VOGT, A., Aarau (*Klin. Mon. f. Aug.*, 54, p 194), for the first time showed (*Arch. f. Ophth.* 88), that shagreen of the lens chiefly consists of regular light elongated walls intercepted by dark furrows, indicating the direction of the anterior layer of fibres and tending to the subepithelial lens sutures which appear as dark stripes. He emphasizes that the shagreen is not mainly produced by the epithelium, but essentially the lens fibres. It is best seen with Zeiss' corneal microscope and Gullstrand's arc light in mydriasis on any point of the healthy lens. It was missing only in certain cases of hypermature cataract. In about 200 persons of different ages the shagreen varied individually as to the magnitude of the grain, showing its independence of the epithelium, whose size does not much vary in different persons. If the reflexion of the lens is increased, as in higher age and in cataract, the shagreen is not as marked, being covered by the diffusely reflected light.

Under pathological conditions the shagreen globules, first described by Vogt, deserve our interest. He found them in about 20% of adults between 20 and 80 years, never in children. They appear black and circular, of from $1/15$ to $1/30$ mm. diameter, i. e., 10 times larger than that of the epithelium, and are visible only in adjustment for the shagreen, and thus differ from the globules of fluid of the anterior portion of the lens, not rare at higher age. At certain directions of illumination they appear as glistening globules projecting over the surface of the shagreen. It is still questionable whether they consist of fluid. Therefore, V. terms them shagreen globules instead of vacuoles. They differ from the ordinary vacuoles by their uniform size in the same individual, and occupy an intermediate zone between the middle and peripheral thirds of the anterior surface of the lens. V. found them more frequent in senile cataract than in entirely clear lenses. On the other hand one sees many cases of juvenile and senile cataract, which show no shagreen globules. In senile cataract they frequently are spread over the whole anterior surface of the lens. Almost always they occur in both eyes and are symmetrically arranged. Pigment remnants on the capsule throw sharply defined shadows on the shagreen which change their positions on movements of the source of light. Corneal opacities give ill defined shadows. The border of the iris throws a differently wide shadow according to its thickness and the position of the source of light.

C. Z.

LIDS

MYCOSIS FUNGOIDES.—KLEIPOL, C. M. (*Tyds. v. Geneesk.*, January 9, 1915), shows a patient sent to him for Röntgen treatment with the following history: Patient came in June, 1913, with an ulcer of the right inner ocular angle with firm border, which had progressed on the upper eyelid, and was pretty deep. After 20 radiations of one hour all was closed, but much infiltration remained. In the beginning of 1914 much edematous swelling of the upper lid was present. Arsenic treatment had no success. Patient states that he had, ten years ago, itching spots on his knee, also above the right eye, on which scabs appeared and which secreted fluid. Spots later appeared on the back and legs. They went and came and differed in size. As a child he had what his mother called ringworm. His only complaint was itching.

Patient looks rather older than his age of 55. He has a fist-like tumor of the upper eyelid, 14 to 8 c. m. large and about 2 c. m. elevated above the surrounding. The tumor is in the skin and movable

in its entirety: blueish-red, the surface is moist through yellow non-smelling fluid, soft with pseudo-fluctuation. The border is sharp and firmer than the rest of the tumor. The eyelashes are gone. Vision present after lifting of the lid. Patient has not much trouble, alone some itching, no pain. No swelling of glands. At the left side of the forehead an about 3 c. m. large elevated patch, of lichen appearance, soft, sharp limited. A few of such spots also on other places of the body. Patient did not allow histological examination nor of the blood. Treatment: With Röntgen rays with lead protection of the surrounding, about one erythém-dosis in the three weeks, sittings of $1/6$ erythém-dosis. The tumor has begun to decrease. At the same time all eczema spots on the body began to heal; some have disappeared altogether. E. E. B.

PREVENTION OF EPIPHORA FROM EVERSION OR INCIPIENT ECTROPION OF THE LOWER LID.—KUHNT, H., Bonn (*Zeit. f. Aug.*, 33, p. 187), discusses his well known wedge-shaped excision of conjunctiva and tarsus with the criticisms of Müller, Helmholtz and Dünner, that the thread at the lid border easily cuts through the formation of an indentation of the cartilage and the homely ridge of the skin. He then describes his modification of the method, which for many years gave him satisfactory results. In order to lift the anterior plate of the lid by the sutures the needles of the doublearmed threads are carried obliquely downwards and outwards, because thus a wider piece of tarsus at the outer surface is embraced by the loop. The edge must be ideally adapted. The wound is dusted with noviform and a binoculus applied. The threads remain for about a week.

If this is not sufficient for the subsidence of epiphora special operations for eversion must be performed, which are described. One method is to produce in the tarsal plate a vertical scar, waxing from the lid border on, which however was given up on account of not sufficiently enduring results.

K. devised the following operation: The lower lid is grasped with forceps near the margin of the middle of the nasal third and maximally everted over a horn plate. While the patient is looking up and outwards the conjunctiva at the retrotarsal fold is incised from the nasal angle almost to the center of the lid, the palpebral half dissected as far as the lower border of the tarsus and with two or three double armed threads taken up 2 mm. from the wound in distances of $1/2$ c.m. The needles are inserted from the epithelial surface, and the width of the loops is from 1.5 to 2 mm. The horn plate is removed, the lid lifted up and forward and the needles car-

ried from the retrotarsal fold to the skin downwards to below the osseous orbital margin. After the threads are pulled so taut that not only the eversion is removed, but a slight entropium is produced, they are tied over a bead of glass or a roll of gauze. For decreasing or increasing the effect, the threads are left long and after a few days the knots loosened or made tighter. C. Z.

A CONTRIBUTION TO THE REMOVAL OF INTENSE TRAUMATIC CICATRICIAL COLOBOMA AND ECTROPION OF THE LIDS, ADHERENT TO THE BONE.—KUHNT, H., Bonn (*Zeit f. Aug.*, 33, p. 198), overcame the difficulties of correcting scars adherent to the bone, encountered in all methods in vogue, by padding fat as substituting tissue between the bone and the reunited parts of the lids and cheeks, which is described in detail. The excellent results are demonstrated by illustrations. C. Z.

MATERIA MEDICA AND THEREPEUTICS

A NEW REMEDY FOR DIPLOBACILLARY CONJUNCTIVITIS.—WOLFF, L. K. (*Tyds. v. Genesesk*, Aug. 15, 1914), succeeded in making a fluorescein-zinc combination by letting fluorescein-kalcium act on sulfas zinci. It is an orange powder, soluble in water 1 on 1000 with ordinary temperature. It dissolves in water to a yellowish-red fluorescent fluid, which does not contain zinc ions. No reagent can demonstrate zinc. Only after reducing the powder to ash and dissolving this ash in diluted hydrochloric acid the zinc can be demonstrated. The solution does not precipitate with acids, alkalies, serum or albuminous substances. It diffuses easily through parchment. The substance contains 15.8% zinc. Sulfas (salicyl.) zinci is an excellent remedy against the diplo-bac. conj., also when this complicates trachoma. However, here it sometimes fails. Wolff brings a little of the fine powder in the conjunctival sac and by slight rubbing divides it more equally. The next visit the conjunctivitis was cured or so much improved that one more treatment cured the patient. One objection is the color. The patient weeps yellow-greenish tears for one day. This cannot be considered very important, as the remedy has to be applied only once, at the most two times.

Experiments on rabbits point to the explanation of the action of the fluorescein-zinci in diplobacilli conjunctivitis to be looked for simply in an antiseptic action of the substance on the microbes.

E. E. B.

TREATMENT OF PNEUMOCOCCIC INFECTIONS, ESPECIALLY SERPIGINOUS CORNEAL ULCERS, WITH OPTOCHIN.—AXENFELD, T., and PLOCHER, R., Freiburg, (*Deut. Med. Woch.*, July 15, 1915). As the type of corneal ulcer varies greatly in different individuals, the value of any therapeutic agent can better be judged from its effect in certain severe cases than from a large series of cases. This paper is based upon this view.

The results from the Freiburg Clinic show that optochin forms a valuable addition to the armamentarium for the treatment of serpiginous corneal ulcer. It is used there as a 2% application directly to the infected area, and not in the form of 1% instillations. This method seems to lessen the production of soluble toxins by the organisms and cause less infiltration. The results obtained have justified its use, although, of course, advanced cases cannot be saved. Surgical treatment must be resorted to at times, but as infrequently as possible because of the resultant scar.

The authors speak bitterly against the idea that the general practitioner is qualified by the aid of optochin to treat this form of ulcer. He is unable to differentiate from the diplo-bacillary infections that also result in a hypopyon keratitis. As zinc is a specific for this, we now possess absolute chemo-therapeutic specifics for nearly all forms of hypopyon keratitis.

H. S. G.

OPTOCHIN IN VARIOUS EXTERNAL DISEASES OF THE EYE.—STENGELE, UDO (From the eye clinic of Prof. Grunert and Dr. Döhler at Bremen. *Klin. Mon. f. Aug.*, 54, p 446), had very good results from instillations of optochin solutions in two cases of serpent ulcer, a case of pneumococcus conjunctivitis, three cases of dacryocystitis, although it does not cure affections of the tear sac, and a number of cases of serophulous and phlyctenular conjunctivitis, with intense photophobia, which was readily alleviated. In a case of parenchymatous keratitis and a case of cauterization of the cornea and conjunctiva the photophobia was not relieved but aggravated. S. ascribes the improvement in photophobia to the bactericidal, not to the anesthetic, action of optochin: 1% solutions are well tolerated, while 5% solutions are irritating and require previous instillation of cocain. The best results were obtained from fresh or a few days old solutions. Those older than three weeks were worthless.

C. Z.

UROTROPIN IN THE TREATMENT OF PURULENT OCULAR INFECTIONS.—ROCHAT, C. F. (*Tyds. v. Geneesk.*, Feb. 21, 1914), states that Whitman in 1912 demonstrated that formaldehyd can appear

in the anterior chamber when urotropin is given internally, and recommended it for infectious eye conditions. Rochat used it with a serious infection after cataract extraction, which resulted in good vision after slitting of the organized exudate membrane in the pupil. He had the same success in another case, where the cornea remained collapsed for two days. Here also disappeared hypopion, infiltration of the wound, chemosis and pain, and after discision vision became good. Of two infected perforating wounds one came with a distinct purulent infiltration of the vitreous. This healed with the same vision as before the accident, while the other became also normal, but needs an operation for traumatic cataract. In a fifth case an iron sliver struck the eye. Patient came four days later with hypopion and much infiltrated wound. The Roentgen-photos showed a great displacement of the sliver in different positions of the eye, which made one think that the sliver was in the eye. After the large magnet was tried Hirschberg's small magnet was introduced after incision of the sclera, all without success; large doses of urotropin were given for fear of extension of the suppuration. The eye became quiet and the pus disappeared. A few weeks later it became soft and was enucleated. A thick connective tissue strand was found across through the bulb, while the iron was found at the outside of the bulb against the sclera. The acute infection, however, had healed.

The administration of urotropin should be tried daily; three to four grams can be given, when the urine is controlled. A 9 years old child showed after three days hematuria; urine became normal on withholding the medicine, and remained so when after a few days three times daily 0.5 g. was given.

He has not been able to demonstrate formaldehyd in the ant. ch. of the rabbit with the reaction of Jorissen, even after puncture.

Rochat kept up the treatment for two or three weeks, constantly controlling the urine.

E. E. B.

TREATMENT OF ULCUS SERPENS CORNEAE WITH SALICYLAS ZINCICUS.—SCHOUTE, G. J. (*Tyds. v. Geneesk.*, Feb. 21, 1914), thinks that time enough has passed since Nicolai in 1905 advocated the use of a 2% salicylate of zinc solution in the treatment of ulcus serpens. He had to wait for an opportunity before he dared to change his accustomed way of galvanocauter a. s. He then gives the history of seven cases. He has not yet become a convinced adherent. The cases, which healed rapidly, were mild ones; small, beginning ulcers with no affection of the lacrimal sac. However, it cannot be excluded that the salic. zinc may have prevented these

cases from becoming grave. Remarkable is the short duration—one to four weeks. The two cases of keratitis disciformis could not be called light, and the impression here of the salic. zinc was indeed very favorable, as also in a neglected case of *ulcus serpens*, where not much was to be gained. Nicolai healed with his method tear sac affections and when pneumococci were present. Schoute never has used salic. zinc in *ulcus serpens* without success. But a careful judgment should be used. As experiment salic. zinc was twice used for *ulcera atheromatosa*, without the least influence. As long as the ideal serotherapy is yet unknown, Schoute considers that salic. zinc is worth consideration.

Discussion.—W. P. C. Zeeman reports about the 33 cases of the Amsterdam clinic during the last five years. If bacteriological examination showed the Morax-Axenfeld diplobacillus the bottom of the ulcer was rubbed in with a 10% zinc sul. sol. A trauma was the cause of the ulcer for fourteen patients; two patients showed an ulcer a few weeks after a herpes corneae; in twelve cases a dacryocystitis was present. Two of the last ones returned the following year with *ulcus serpens*, although after recovery of the first ulcer the tear sac was extirpated.

He has come to the following conclusion: Very little benefit can be expected from cauterization, and absence of profit is a disadvantage, because the process progresses. It will, therefore, not more, or very seldom be applied. The slitting of the ulcer produced an excellent result and especially where it was directly applied. As soon as careful nursing, atrop. etc., had shown their impotence, the process became halted. The technic is as follows: An experienced assistant keeps the lower lid down with his thumb or with a thread going through muscles and skin at the height of the lower orbital border to prevent squeezing. Taylor's broad needle is now carefully pushed slantingly in the progressing wall of the ulcer until in the ant. ch., and the incision enlarged toward the right and left. This last one is made with the bent, dull knives of Prof. Straub, to prevent wounding of the lens.

Discussion.—Dubois thinks that Schoute and Zeeman had a different material. He likes for the cases of Zeeman a report of the usefulness of the eye, expressed in visual acuity.

Zeeman: The V. A. seems to me a poor measurement for judging of the treatment, as this depends chiefly on the place of the ulcer. The clinical study of the condition before and after intervention determined the judgment.

Mulock Houwer prefers slitting of the cornea over salicyl. zinc

Wolff refers to the good results which Morgenroth had with aethylhydrocuprein.

Faber says that salic. zinc has especially good results when dacryocystitis and conjunctivitis are present. He uses 2% salic. zinc for the ulcer and flushes the conjunctiva with a 1/2% sol. He saw result from Saemisch operation.

Nicolai is still satisfied with salic. zinc. He does not understand Zeeman's success with the slitting, where everywhere else Saemisch's operation was so unsuccessful that continuously a better procedure was looked for. He points to the simplicity of the treatment. The ulcer is rubbed with a cotton pledge soaked in 2% salic. zinc and further dropping in a 1/10% every hour. He treats also the nasal canal. As well with the Morax-Axenfeld bacillus as with the pneumococcus, the results were good.

Verwey said it is remarkable that ulcer heals often quickly under simple antiseptic and oclusive bandage. It is also remarkable that the ulcer serpens of tinkers runs such a serious course. It seems that kettle stone contains an unfavorable substance. Zinc. sulfat acts as good as zinc salic. He suggests not to cauterize, but to keep the hot cautery at some distance from the ulcer, as Weekers did.

Piekema saw a very different result from salic. zinc. He does not consider it better nor worse than the other treatments of ulcer serpens. Contrary to Zeeman, he had seen very good results from puncture of the ant. ch. Prof. van der Hoeve lauds the method of Weekers. Cauterization gives too large and thick scars. He also likes the vapor-cauterization of Wesseli (100° C.), which does not produce an action at a distance. It also helps for deep serophulous ulcera.

Van Dyck saw good results in one case with pyocyanase.

Lans praises salic. zinc, also in pneumococci infection.

Zeeman did not specially point to treatment of the tear sac, as this was self evident. He considers very important the unfavorable result of cauterization resulting from his numbers. Also Dimmer lately stated that zinc. sulf. was valuable to combat the pneumococcus.

Schoute mentions that salic. zinc, in 10 to 20% sol. is very painful. He recommends it in weak solutions. The thermic treatment of Weekers and Wessely depends on the fact that pneumococci are killed at 60° C.. Probably according to van der Hoeve's results, the staphylococcus is also killed at that temperature.

E. E. B.

ABOUT THE CUTI-REACTION OF NOGUCHI FOR LUES.—WOLFF L. K., AND ZEEMAN, W. P. C. (*Tyds. v. Geneesk.*, September 26, 1914), found it as difficult to judge the reaction of pallidin as of luetin. Therefore they do not consider it of much value, also because it is only positive in some forms of lues, less frequent than the luetin. The valuation of the reaction was not always easy; one has to learn to appreciate it in a number of certainly non-luetic patients, especially as Noguchi did not add a control fluid which does not seem an improvement. The tertiary form of Syphilis is characterised by a change in the reaction power of the skin ("Umstimmung"). The writers wished to know if such an increased vulnerability also is found in other (diseased or not) conditions. They had not found any reports in the literature. They took nine scrophulous children, the youngest one being 1½ years old. The reaction was in all nine entirely negatives.

Their results are as follows:

Diagnoses.	Wass.+	Wass.+	Wass.—	Wass.—
	luet.+	luet.—	luet.+	luet.—
Kerat. parench. (17)	12.	2.	1.	2.
Iritis luet. (4)	2.	—	1.	1.
Chor. luet. (1)	1.	—	—	—
Tabes and D. P. (12)	1.	5.	—	—
Lues cerebri (1)	—	1.	—	—
Lues II (1)	—	—	—	1.
Lues III (3)	1.	2.	—	—
Total (39)	23.	10.	2.	4.
			Luetin+	Luetin—
Iritis non-luet.			—	2.
Keratitis diffusa			—	2.
Keratoscleritis			1.	2.
Cyclitis			—	1.
Scrofulosis			—	9.
Spina ventosa tuberc.			1.	—
Normal			—	2.
Total			2.	18.

They found a positive reaction twice in non-luetic conditions: the one a ten years old girl with spina ventosa of the middle finger, the other a woman with typical keratoscleritis tuberculosa and negativ Wass., who did not have in anamnesis and status praesens any hint for syphilis. In two cases the luetin reaction was positiv and Wass. negativ, where syph. was certainly present.

They come to the conclusion that the luetin reaction should have

a discreet place in our diagnostic armamentarium, that a positiv huetin reaction points at a present lues with very great probability and therefore is of very great value with a negativ Wass. The valuation of the reaction needs a certain experience, which excludes a general application. They would like a control fluid, which could facilitate the judgment of the reaction and consider this desirable in judging the more or less specificity. E. E. B.

CLINICAL EXPERIENCES WITH SUBCONJUNCTIVAL INJECTIONS OF POTASSIUM CHLORIDE IN CHRONIC DISEASES OF THE UVEA.—BADER, ALFRED (From the eye clinic of Prof. C. Mellinger in the University of Basel. *Zeit. f. Aug.*, 33, p. 155). The experimental investigations made at Prof. Mellinger's clinic on the harmless, but very stimulating, action of subconjunctival injections of neutral potassium salts on the eyes of rabbits (*Zeit. f. Aug.*, 33, p. 1, reviewed in *Ophthalmology*, July, 1915), suggested the trial of potassium chloride for therapeutic purposes in chronic diseases of the uvea of the human eye. B. reports in detail their experiences on 6 cases with the following conclusions: Subconjunctival therapeutic injections of from 1 to 2% solutions of potassium chloride are well tolerated by the eye. They are more painful than the corresponding salt solutions and are advantageously made with an addition of 1% novocain. Having a more intense action than salt solutions, weaker concentrations and smaller doses suffice for therapeutic stimulation. They favorably influence the diseased tissues of the eye by exerting a local hyperemia, promoting the circulation and thereby bring about e. g. the absorption of intraocular inflammatory products, as opacities of the vitreous, etc. In other words they are a new stimulant, which may be employed as an adjuvant in subconjunctival injections of salt solutions. C. Z.

INTRAOCULAR REPOSITION OF THE IRIS.—ELSCHNIG, A., Prag. (*Klin. Mon. f. Aug.*, 54, p. 186). After simple extraction of soft cataracts through incision with the lance-shaped knife, especially after preceding discision or in traumatic cataract, in which the iris was more or less damaged and difficult to replace, it sometimes happens, that after restoration of the anterior chamber the iris appears to be covered by tender remnants of cataract or fibrin, or a fine filament of the capsule courses over the pupillary margin to the wound region. In any such case the iris may be drawn towards the wound and in the course of from 3 to 4 weeks the pupil assumes the shape of a slit. This may be easily remedied by cut-

ting the covering tissue near the pupillary margin with Knapp's needle knife introduced subconjunctivally, as E. did in 5 cases. Immediately after the operation eserine is instilled, but from the following day on the pupil is kept dilated with atropin. C. Z.

MEDICAL ECONOMICS

TRAINING FOR BLIND SOLDIERS.—HARE, JAMES H. (Special war photographer for *Leslie's Illustrated Weekly*, September 23, 1915).

"One of the beautiful West End, London, villas, with its magnificent park of 403 acres has been turned into a training school for soldiers and sailors blinded in the war. It is St. Dunstan's Villa, now leased by Otto Kahn, of New York, and through his generosity placed at the disposal of the Blinded Soldiers and Sailors' Care Committee, of which C. Arthur Pearson, president of the National Institution for the Blind, is chairman. I had a hazy notion that Mr. Pearson was blind, but changed it when he rose from his seat to greet me and, looking me straight in the face, glowed with enthusiasm over the work they were accomplishing in training these sightless men. Whilst we were talking one of his secretaries approached from the other end of the room and stood hesitatingly with a telegram in her hand. She had made not the slightest sound, but he instantly excused himself for a moment and inquired what she wanted. Then I was sure he was not blind, but only to be undeceived later.

"It was astounding to see with what confidence the men who had been there some time moved around owing to a little device. There was a strip of matting on the floor which denoted a free passage. No obstruction was allowed to be placed upon it so they could walk upon that with confidence. When their feet touched a raised mat they knew they were near a door; outside the building a strip of lead a couple of feet in width took the place of the matting and boards placed across the passage way denoted the need of caution—either there were steps near or some other obstruction that called for care in moving around. It was really a danger signal.

"There were over 70 inmates, including three or four Canadians. Most of them had received their injuries in the trenches, some by bobbing their heads up to see what was going on, others hit by shrapnel. Gas did not seem to be responsible for any of the injuries. Everybody about the place endeavored to instil confidence in the men. There was no attempt to coddle. Instead of wasting time sympathizing, which only made them feel their affliction worse, they were told how fortunate they were to be alive or not to have lost

limbs like some had. The management knew that if these men returned to their homes they would be acclaimed heroes, as they undoubtedly are, and a good deal of enthusiasm would be expended upon them in giving them as good a time as possible, but after a time this would begin to pall and they would become a burden to the community, so it was essential for the future of the men themselves as well as their friends that they become self-supporting if possible.

"It was astonishing to see with what enthusiasm they entered into the different professions which included massage, boot repairing, mat making, market gardening, poultry raising, typewriting, even carpentry. It was a revelation to see the skill already acquired by the blind—many teachers from blind schools have given their services to help the staff that was recruited from the Voluntary Aid Detachment, and some of these teachers, blind themselves, have demonstrated their efficiency by becoming experts in various professions.

"The Braille system of reading, writing and typewriting is taught. One of the teachers, a Miss Wood, I was told could take dictation at the rate of 120 words a minute. Instead of the stenographer's note book a small machine has been invented to make dots.

"Then there were men learning poultry breeding, attending to the incubators, cleaning out the houses, etc., some even making their own brooding houses, and foster mother contrivances. Owing to an ingenious use of small pieces of glass used as a jingle, it was an easy matter to open and shut gates leading from the various fowl runs. When the men are qualified it is intended to set them up in business in a small way, probably in their native towns, and to get the public to help them to help themselves."

H. V. W.

MISCELLANEOUS

OCULAR DISEASES IN THE ARMY.—ZADE, Heidelberg (*Munch. Woch.* No. 22 and 23, 1915.) A rather long article written for the army surgeon from which the following conclusions were drawn:

The most satisfactory measure for relieving pain in ocular disease is the local treatment.

Cocain is not an analgesic; it serves merely as an anaesthetic for examination and treatment. Aspirin and morphine are more satisfactory as analgesics.

In all injuries of the eye, even from remote explosions, the first thought must be of Contusio Bulbi (intra-ocular hemorrhage). This

condition may be suspected, even without ophthalmoscopic examination, if the vision is very poor.

In the case of small perforations of the eye, the first procedure is the excision of the prolapse, to be covered by the Kuhnt method if necessary.

In the case of larger subconjunctival perforations, conservative treatment is to be adopted. Large perforations with partial destruction of the eyeball call for exenteration.

In case of head wounds, both surgical and ophthalmological experiences have taught to make an examination under narcosis and if necessary operate, removing foreign bodies, etc.

Discussion of a few cases of hemeralopia and one case of Iritis Gelatinosa due to influenza.

H. S. G.

MUSCLES

STRABISMUS.—VALK, FRANCIS, New York (*Ann. Ophth.*, July, 1915). No one of our theories is accepted as an explanation of the cause of squint. The practice of operating as a last resort is condemned. The author thinks it is possible to determine in the beginning in every case whether operation will be necessary. In his opinion a case of fixed squint which is cosmetically corrected by glasses is simply converted into a latent squint or phoria and is then the cause of asthenopic symptoms. Therefore he finds that operative interference is indicated in almost every case. As to whether the operation should be an advancement or a tenotomy or both depends upon the findings of the tropometer. If the external rotation is equal, and is subnormal in each eye, with the internal rotation of each eye about normal he advises an advancement of each externus at once and later such guarded tenotomies upon the interni as may be indicated. He of course corrects the error of refraction. If he finds the tropometer shows the muscle error to be confined to the squinting eye he confines his operative work to that eye and may advance or tenotomize according to the indications as pointed out by the tropometer findings. He believes that when vision is below xx/200 in one eye that it is congenitally amblyopic and can not be improved, but when the vision is better than xx/100 that it is acquired and can be improved by the usual methods. He believes in the muscular theory of squint as the true determining cause, complicated and advanced by the contributing causes of refractive errors, amblyopia and disturbance of fusion. He is opposed to putting glasses on babies as soon as they begin to squint. His experience has taught him that as the true cause of

squint never changes, we may have the same success with glasses, exercise, atropin, etc., when the child is old enough to make a correct diagnosis of the refraction, as to try these measures before the child has left its mother's breast.

M. B.

BACKWARD MOVEMENT OF THE BULB IN ADDUCTION WITH CONGENITAL PARALYSIS OF THE MUSC. RECTUS EXTERNUS.—HOEFNAGELS, J. P. A. (*Tyds. v. Geneesk.*, Feb. 21, 1914), describes the following two cases from the Amsterdam clinic:

1. Seventeen-year old girl complains of fatigue while doing her evening school work, seeing double from time to time. She squinted, according to the mother, from time to time since birth. Vision O. D. and O. S.=1. The visual lines seem parallel for distance. All movements of O. D. are normal. If both eyes are uncovered O. D. fixates, O. S. deviates slightly toward the left by seeing upward. While seeing downward no deviation. Very slight abduction with widening of the eyeslit and a slight exophthalmus by seeing toward the left. The left eye slit narrows much while seeing to the right, while the bulb moves backward and the cornea turns toward the nose and upward. If the eye is kept open the cornea is seen to make the following motion: First it is moved a little toward the nose, the bulb at the same time turning a little around its sagittal axis outward. At the same time a backward movement of the bulb is visible, which increases with augmented vision to the right, while the cornea turns nearly perpendicularly upward, so that it disappears nearly behind the upper lid. Is an object fixed in a much lower plane than the left bulb is seen to be turned too much downward. Retraction alone happens, when the fixed object descended a little moving from left to right.

The motion upward happens without visible deviation to the left if the right eye is covered, so that O. S. fixes. The adduction happens then about as in seeing with both eyes. However, the retraction is much stronger before the cornea turns upward. Also here the retraction happened without deviation up or downward, if the fixed object descended slowly while moving from left to right. The sclera becomes tense a little above the insertion of the M. rect. ext. when patient looks strongly to the right. The movement backward measures 2, 5 mm. with convergence no retraction or turning upward, but only a very slight displacement toward the nose. Binocular vision: With Hering's instrument in twenty trials one mistake: by seeing toward the right nine mistakes in twenty trials: seeing toward the left, eleven mistakes in twenty trials. Only occa-

sionally clear images with stereoscope. Double images only on seeing to the left. Homonymous double images while seeing to the left. Crossed images while seeing to the right, the image of the left eye being to the right and below that of the right eye.

2. A 12-year-old girl, under treatment for trachoma. According to the mother, the left eye had been since birth smaller than the right one. She also always squinted, seeing to the left. She has never had double images. The left side of the face is markedly hypoplastic, which accounts for the much deeper situation of O. S., which is 5 mm. deeper than O. D. Refr.=E. Visus each eye $5/4$. Visual axes parallel for distance vision. All movements of O. D. are normal. O. S. shows no difference, when both eyes look together as when it fixes alone. Motility up and downward, normal; is absent to the left; to the right, the bulb turns inward at the same time as it is moved backward. This backward movement begins directly as the nasalward one begins, but increases in distinction the more the look is directed to the right. The motion of the bulb impresses as a turning with a larger radius than that of the bulb, and with a center which is situated more toward the temple. Turning from right to left the bulb turns downward, when the fixed object is kept low. During seeing to the right the sclera becomes tense slightly below the normal insertion of the M. rect. ext.

The tension of the sclera at the temporal side by seeing to the right (adduction) makes it probable that the M. rect. ext. is replaced by a connective tissue strand. The absence of elasticity of this band can explain the backward movement of the bulb with contraction of the M. rect. int. The retraction, which appears with adduction, while the patient looks downward, is combined with turning of the cornea downward. A similar condition is described in the first case. Both can be explained because the insertion of the connective tissue strand is removed from the normal place, as could be observed with certainty. It is possible that this transformation in connective tissue is due to a trauma during birth. During normal labor in 70 to 60% the head descends so that the left parietal region rests against the promontorium. The compression, which the head hereby sometimes undergoes can be very important. Easily the left parietal region, and thus the left external eye corner can have to be used as hypomochlion. In that case the possibilities for a strong pinching of the M. rect. ext. are present. If this period of the parturition does not last too short, then under circumstances an ischaemia of the M. rect. ext. can appear, which only shows later, when the ischaemic paralysis is brought about.

Volkman has shown that interruption of the circulation in a muscle for two to three hours produces a myositis. After interruption of five to six hours then the largest part of the muscle cells have undergone a lasting change. This degenerated part was substituted by connective tissue. E. E. B.

ON UNILATERAL NYSTAGMUS.—SCHMIDT, PETER (From the eye clinic of Prof. A. Peters in the University of Rostock. *Klin. Mon. f. Aug.*, 54, p. 491), reports two cases and gives a review of literature, which shows that the same categories may be distinguished in unilateral as in bilateral nystagmus. In a large number of well observed cases of cerebrospinal diseases the unilateral nystagmus was only illusive, because it was minimal in the other eye. If unilateral nystagmus was associated with strabismus, it was vertical, as in the majority of cases of impaired sight. In one case of the author minimal oscillations were observed, also in the other eye during ophthalmoscopy. This supports the views of different authors that unilateral nystagmus is only a variation of the bilateral. As proof of this he mentions the observation of Neustätter and others, that in some cases nystagmus may pass from one eye to the other. C. Z.

OPERATIONS

GENERAL ANAESTHESIA FOR EYE OPERATIONS.—BUTLER, T. HARRISON, Coventry, Eng. (*Brit. Med. Jour.*, April 3, 1915). In spite of the peculiar advantages which the eye offers for the action of local anaesthetics, and of the variety of drugs which we now have at our command for rendering the globe insensible to pain, there are still many operations which call for general anaesthesia, and some patients who are unsuitable subjects for local anaesthesia alone. Our operations are usually of such short duration that the problem of general anaesthesia in eye work is not exactly the same as that presented to the general surgeon, and merits special consideration.

The writer says that a general anaesthetic must be used when the operation is of such a nature that pain cannot be adequately abolished by a local analgesic; when, owing to tender age or diseased mentality, the patient does not possess the necessary self-control; and, finally, when the psychological effect of the operation, even when it can be performed more or less painlessly, is liable to affect the patient adversely.

He points out that cocaine and other local analgesics do not exert their full influence upon an inflamed eye; hence general anaesthesia

is indicated for iridectomy in acute glaucoma and for operations during acute irido-cyclitis, and in the presence of marked ciliary congestion. Paracentesis or a Saemisch's section is apt to be exceedingly painful if the eye be inflamed, and local analgesics will probably fail and it is better to employ gas or gas and ether for these operations under such circumstances. He advises removal of the sac under the local use of cocaine and adrenalin. He advocates general anaesthesia in operations upon the tarsus and lids, since it is difficult to obtain analgesia, and extensive infiltration with local anaesthetics diminishes the vitality of the flaps.

He finds that many children tolerate operations under local anaesthesia as well as adults; advancements can sometimes be performed on children of 6, but generally until 8 advancement requires a general anaesthetic; in addition to instilling 5 per cent cocaine, he injects a few drops of codrenine under the conjunctiva round the lateral recti and this renders advancement and tenotomy painless. In children, temperament and home training decide the nature of the anaesthetic rather than years.

The writer next discusses the question of the choice of an anaesthetic and gives numerous statistics to show how dangerous chloroform is and the great advantages of ether from the standpoint of safety.

C. H. M.

LIMBAL PUNCTURE.—SMITH, DAVID PRIETLEY, Birmingham, Eng. (*Ophth. Review*, Feb., 1915). The writer describes an operation which he has performed with ideal results, three times for buphthalmos and seventeen times for glaucoma. This operation is not new, having been performed by Solomon, Hancock, Pritchard and others, but never in the manner employed by Smith.

The operation is as follows when performed for buphthalmos: The puncture consists of a radial slit through the limbus, angle of anterior chamber and periphery of iris, into the vitreous. The ocular conjunctiva is seized 4 mm. above the corneal margin and drawn down over the cornea until the limbus is peeled of its own conjunctiva and covered only by that stretched down from above. This traction also turns the eye down. The globe is now pierced to a depth of about 5 mm. at the limbus perpendicular to the surface of the globe, the Graefe knife being held with its back toward the visual axis and the blade aiming for the center of the globe. The knife is withdrawn and the conjunctiva is released and goes back into place and covers the wound in the limbus.

The procedure in adults differs in one vital point from that in buphthalmos, namely, the direction of the knife necessary to avoid

the lens. The back of the knife must be *parallel to the visual axis*. In a few persons over 50 the lens reaches a diameter of 10 mm. but not more. So I think the rule should be that if the clear cornea is less than 11 mm. across in the meridian in which the puncture is to be made (usually the vertical), the knife must be entered outside the limbus, always being kept parallel to the visual axis. Except in cases where the periphery of the iris is adherent to the back of the cornea, the knife thus directed can always open the anterior chamber without touching the lens, for the chamber is always wider than the lens. In many cases there is a trickle of blood down the anterior surface of the iris showing that the anterior chamber has been opened.

The results were as follows: In buphthalmos, there was one case arrested, one unchanged and one forlorn hope lost. In adults hopeless cases were selected and 17 punctures were made on 11 eyes. The favorable results included three cases, one of absolute glaucoma in which T+3 was reduced to T+1; another, an instance of late acute glaucoma in which T+3 was reduced to normal; and a third, chronic glaucoma, on which three other operations had failed. In no case has the operation done any harm of any kind.

In a few cases the conjunctiva will not peel off. Although the anterior chamber is opened its depth is seldom noticeably altered, for the knife taps the vitreous also, and the two chambers being therefore in communication the escape of fluid lowers the pressure in both equally, and the anterior chamber is not emptied by superior pressure from behind as happens when it alone is tapped.

C. H. M.

AN IMPROVED TECHNIQUE IN FORMING A SUPPORT FOR AN ARTIFICIAL EYE.—RITCHIE, F. G., New York (*Jour. Ophth. Otol. and Laryng.*, June, 1915). The conjunctiva is severed around the cornea in the usual manner. The capsule and muscles are then detached and a purse string suture is used to engage the capsule between muscles and then capsule and muscles as fast as the muscles are severed from the globe and so on until the purse string suture is complete. The eye is then enucleated in the usual manner, the orbital cavity dried and a piece of rubber sponge, cut a little smaller than the eyeball, is inserted and closed over with the purse string suture. The latter is composed of No. 3 braided black silk and is removed on the seventh day. He claims that the rubber sponge is well adapted to the tissues, is retained and gives no trouble.

M. B.

A SUCCESSFUL METHOD FOR THE REMOVAL OF A FULLY DISLOCATED (LOST) LENS, HERETOFORE CONSIDERED AND REFERRED TO BY AUTHORITIES AS "IMPOSSIBLE OF EXTRACTION," TOGETHER WITH FIVE OTHER CASES.—PAINE, HOWARD S., Glens Falls, N. Y. (*Ann. Ophth.*, July, 1915). It is very apparent from the quotations made from all the leading text books that an endeavor to remove a lens dislocated into the vitreous is universally condemned. In view of this fact the author saw the eye of a patient disintegrate without thinking it possible to do anything. The lens of the other eye of this same patient became dislocated and he then felt that something had to be done. He successfully extracted this lens, notwithstanding it was lying back of and against the ciliary body. The strong feature of his method is the illumination of the eye with a sixteen candle power light in a ground glass globe placed above and in front of patient's head. With a lens of three inches focus this light is thrown into the eye. He claims that the dislocated lens if carefully searched for can be plainly seen. Some of the eyes when operated upon were in a state of acute glaucoma, which bespeaks for a cloudy cornea and a fixed semidilated pupil, an eye which would give no reflex with the ophthalmoscope. Just how it is possible to focus light into such an eye to a point of enabling the operator to see into it well enough to locate the lens in the vitreous is difficult to understand. The technic of his operation is excellent, namely Smith's fixation and elevation of eyelids so that all pressure is removed from the globe, a section with a large conjunctival flap, the transfixing of the lens with a small sharp hook, and bringing it to the front of the eye when a Smith's spatula is slipped under it and the lens pressed out by making pressure over lower part of cornea with a hook. The lens is not scooped out, but is pressed out. He reports six cases so operated on with most excellent results.

M. B.

ESPECIAL TATTOOING TASK.—STREIFF, J., Genua (*Klin. Mon. f. Aug.*, 54, p. 184). A man, aged 18, had in consequence of cauterization by hydrochloric acid in his fourth year, a total leucoma, the whole limbus, excepting the temporal portion, being covered by folded conjunctival tissue. Tattooing by the usual method was soon frustrated by excessive proliferation of the epithelium and connective tissue from the surroundings. S. therefore made of the new formed tissue a quadratic bridge by undermining it with a broad cataract knife and brought the India ink on an iris spatula under it under light pressure on the eyeball. In two further sittings he rounded the obtained quadratic pupil by mere puncturing and stain-

ing with India ink. The limbus was made with a thread of silk, impregnated with India ink, which was carried under the conjunctival conjunctiva for a distance of 2.50 mm. This was continued until the stained stitch canals completed the arc of the limbus with excellent cosmetic success. C. Z.

SCLERECTOMIA AB EXTERNO.—FORONI, SAMILLO, Genua (*Arch. f. Ophth.*, 89, p. 393), describes his modification of LaGrange's operation. After injecting a few drops of novocain-adrenalin under the upper portion of the ocular conjunctiva, this is grasped with a toothed forceps, 1.50 cm. above the corneal limbus, and by von Graefe knife with the back towards the sclera a horizontal incision is made, forming a flap of 2.50 cm. long and 1 cm. high, which is carefully dissected down to the limbus. A scleral section is made near the limbus and parallel with it, the point of the knife held vertically to the sclera. 1 mm. above this a second equal section is made and the circumscribed piece of the sclera is cut off with scissors. The conjunctiva is sewed by a continuous suture which remains for from seven to eight days. F. performed this operation with good results in the different forms of glaucoma, keratoconus, detachment of the retina, and hydrophthalmus. He also used it for performing iridectomy in cases of total anterior synechia with complete abolition of the anterior chamber, and for optical purposes. F. claims considerable advantages of his operation over those of Lagrange and Elliot. It is easier than the former, and the cleft, made in the sclera gives a better access to the iris, if this has to be operated upon, and furnishes a larger area of filtration corresponding to the obliterated angle of the iris than the circular opening of Elliot. The decrease of tension is attained at once and permanently. F. saw in no case early or late infection or striped keratitis. C. Z.

IMPLANTATION OF A GLOBE OF BONE AFTER ENUCLEATION AND REMARKS ON RESECTION OF THE OPTIC NERVE.—PAGENSTECHE, C. H., Wiesbaden (*Arch. g. Aug.*, 79, p. 99), reports four cases, operated on according to the method of Schmidt and re-examined after from two to three years. In concordance with the experience of Schönte, P. found in three cases small granulations due to permeation of the porous material, which give a certain prospect for permanent healing. The globe resembled after some time a phthisical eyeball. Its movements were good, but the motility of the superimposed glass eye was not better than after ordinary enucleation. Therefore P. does not consider its implantation as a cosmetic advantage.

He describes the method, devised by his father, of resection of the optic nerve, which is frequently performed at his clinic in place of enucleation, in 100 cases from 1898 to 1913. In most cases it is not done as a prophylactic against sympathetic ophthalmia, but for preserving the blind eye, chiefly in painful absolute glaucoma and staphyloma. The resection lowers the intraocular tension and removes the pain, but never leads in these cases to atrophy of the eyeball.

C. Z.

FOR THE PREVENTION OF POST-OPERATIVE INTRA-OCULAR INFECTION.—SACHS, M., Vienna (*K. K. Gesellschaft der Aerzte, Wien.*, May 7, 1915). S. proposed a new type of iridectomy that he has performed in four cases. An incision is made through the skin of the lower lid at the edge of the tarsus and a blunt dissection between the eyeball and ocular conjunctiva performed. The incision into the eyeball is made with a keratome and the iridectomy finished in the usual way. The skin is then sewed together and as the incision lies in the folds of the skin produced by movements of the lower lid, no visible scar results. (The same result can be attained by absolute sterility of the conjunctival sac, as Elschnig has shown.)

H. S. G.

ENCLOSURE OF PARAFFINE IN THE SCLERA AND TENON'S CAPSULE.—SPELEERS, REIMOND (*Tyds. v. Geneesk.*, July 4, 1914), tried to prepare a stump in the rabbit with artificial vitreous of paraffin of 50° C. melting point. He succeeded with five animals, but four died of an accidental stable epidemia and the last one he wanted to save for microscopical study to see what had happened with the paraffin after some time. He relates his six cases. The four implantations of paraffin balls in Tenon's cavity were all successful. The first is two years and seven months, the second two years and three months; the third one year and seven months; the fourth remained well for two months, but was accidentally looked upon by the family physician during a conjunctivitis as a pus collection, punctured and removed. Two paraffin implantations in the sclera have been done. The first executed under very favorable conditions (double cutting of the sclera and infected wound) is expelled with mortification of the sclera. The second heals well after severe reaction and remains so after one year and two months. In one rabbit the paraffin prothese was successful for at least two years, when the animal died.

The cosmetic result is excellent. Speleers prefers the paraffin with high melting point above all other material for implantation:

it is easy to be made germ free, it has no chemical action and is not absorbed after time.

E. E. B.

OPTICS

OBJECTS FOR THE SCIENTIFIC DEMONSTRATION OF THE VISUAL ACUITY.—STRAUB, M. (*Tyds. v. Genceesk*, Sept. 19 1914), mentions that greater accuracy can be gotten with Landolt's ring, which makes differences of one-tenth, than with Snellen type. The physiologists have never been friends of the letters. They recognized only the double point. They found the visual acuity by determining the largest distance at which can be distinguished the open space between two points. One calls the visual acuity the formsense, the power to distinguish forms with the eye. But the ophthalmologist can not use the double point: it is too monotonous, gives not enough opportunity to control the examined.

Generally the visual acuity is called the form sense or space sense of the retina, but it is rather the direction sense of the visual organ. Space has three dimensions, but the visual acuity gives us only two dimensions, because it does not give the distance, but only the direction of the observed points. Direction sense is still too general, and not right without restriction. The determination of the null-direction, of the direction in which we see, has nothing to do with the visual acuity. The visual acuity gives us *difference* of direction. The visual acuity is the power to appreciate differences of direction through the visual organ. When we examine the visual acuity with the double point it depends on the angular distance of the points. One determines the soc. minimum seperabile. It follows from this that the visual acuity can be examined with an object, which limits two bordering directions without intervening space: two confluent points or a small bar. The largest distance at which such a small bar can be recognized is the distance where it touches two contiguous directions. As most simple form the small bar is to be preferred over the double point. Straub has constructed types where bars in four directions are interposed by points, which contain the same amount black as the bars. The examined must first tell whether a point or bar is shown, and if it is a bar its direction. Of course, the measurements of the bars only are used for determination of the visual acuity. The points only serve for control. The difference can be taken according to the decimal scale. These charts are very valuable for certain examinations, not for daily use, as the fixation of these small objects is difficult and fatiguing. One of the advantages of the five times larger letters is the easier fixation.

As Straub wished to retain the bar as foundation for a practical useful test object, he changed the well-known books of Swellen, so that he collected ten types of equal value of the general form of the letters of Snellen. These also can be made in decimal intervals.



An objection against these figures is the greater exertion, which is necessary for a scientific or more thorough examination. For daily practice the letters are to be preferred.

For scientific work, for comparing and comparable determinations where the letters can be used, Straub hopes that his bars and figures will be used with Landolt's rings. E. E. B.

SHOOTING GLASSES.—SCHANZ, F. (*Münch. Med. Woch.*, v. 61, No. 44, p. 2191). It is a well known fact that under a bright sky the shooting results are inferior to those in cloudy weather. The bright light of the sky tires the eye. This is due to the short waved rays, not directly visible to the eye. They are partly absorbed by the crystalline lens, partly converted into rays of greater wave length and cause the fluorescence of the lens. Schanz devised a method the whole interior of the eye and elicits a contraction of the pupil. Hence this stimulus is capable of soon tiring the retina, especially as, contrary to the excitation by the visible rays, it affects the whole retina. The glaring at sea, on high mountains, of aeronauts, and snow blindness are also produced by these rays. The euphos glass of Schanz absorbs these rays and protects the eye from their injurious influence, as Dr. Flemming experienced in a balloon flight over 8,000 m. and R. Amundsen in his expedition to the South Pole.

The short waved, not visible, rays also diminish the perceptive faculty of the retina at dusk, which can be prevented by the euphos glass. In addition its yellowish green color increases the contrasts in nature. The bluish tints appear through it black, so that the parts illuminated by reddish and yellowish light are better displayed, and targets can be recognized, which the naked eye cannot any more distinguish. Schanz recommends for the navy euphos gray glasses against glaring by search lights, etc. C. Z.

OPTIC NERVE

AN ABSCESS OF THE OPTIC NERVE.—GRADLE, HARRY S., Chicago (*Ann. Ophth.*, July, 1915). The patient was 55 years old and was

seen in Elschmig's Clinic in Graz in December, 1892. He had suffered for a year from a carcinoma of the right maxillary antrum. His right eye became suddenly blind. There was exophthalmos of ten millimeters. The pupil was dilated and reacted consensually only. Ophthalmoscope showed no changes. A month later the patient died.

At necropsy the light optic nerve at base of skull was found thickened as far back as the chiasm. The carcinoma, which in places was suppurating, had broken through into the orbit at the apex and was pressing on the nerve. At the bulbar end the nerve sheaths were swollen into an ampule form. The roof of orbit was lifted away and the entire course of the nerve exposed. The intracanalicular portion of nerve was swollen as much as its bony limitations would allow. Here the dura on the nasal side was involved in the tumor. On endeavoring to separate the nerve from the new growth, the dura burst and there was evacuated a small amount of creamy pus that contained Gram positive diplococci. The course of the nerve from the comisure to the globe is shown and cross sections of it were examined microscopically in seven places and the pathologic findings are given in detail. The abscess was in that portion of the nerve lying in the bony canal and was in the center of the nerve. The dura was first attacked and drawn into the abscess, following which the abscess attacked the nerve proper. The case is of especial interest in that it throws light on the scotomata and blindness secondary to accessory sinus disease. That portion of the nerve immediately back of the globe contains the central artery and vein, after they leave the nerve there is a short stretch of nerve without any large central vessels. In this area and posterior to it small veins run from the surrounding sheaths and nerve fiber bundles toward the center of the nerve, finally uniting to form a small central vein, the *vena nervi optici centralis posterior*. Toward the basal end of the canalicular portion of the nerve this vein assumes a fair size and is fed by venules from the nerve proper, as well as from the nerve sheaths. It finally empties directly into the cavernous sinus. In the bony optic canal the ophthalmic artery lies below the nerve and is embedded in the dura, which serves the double purpose of optic nerve sheath and periosteum. The true periosteum lining the orbit blends with the dura at the orbital end of the canal and loses its identity. Hence any infection of the periosteum can pass directly into the dura and thence, through the posterior central vein, into the center of the nerve itself. As this posterior central vein lies in close proximity to the papillo-macular bundle, any inflammatory involvement of the vein would lead primarily to a

central scotoma and eventually to blindness. Any infiltration around the vein, with a subsequent destruction of the papillomacular bundle within the canalicular portion of the nerve would result in a descending degeneration of this bundle. M. B

TO THE ANATOMY OF COLOBOMAS AT THE ENTRANCE OF THE OPTIC NERVE.—LÜDEKE, F. (From the eye clinic of Prof. A. Peters in the University of Rostock. *Klin. Mon. f. Aug.*, 54, p. 468), gives a very good review over the incident literature and the anatomical description of a case of coloboma of the iris, chorioid and optic nerve. The upper portion of the optic disc and lamina cribrosa showed normal structure, but the lower portion below the central vessels contained no nerve fibers. They were supplanted by connective tissue in which no sheath could be recognized. At the border coursed tracts of connective tissue leading into the sclera, which appeared very much thickened. The thickened part was formed by bundles of scleral fibers atypically differentiated, and within their meshes was a chaos of glious and connective tissue, as described by Seefelder. Immediately below the lower border of the optic nerve was a deep indentation whose inner surface was lined with scanty glious tissue and which was in connection with a small cystic cavity. In the depth of the tissue was a larger cyst with a more developed glious lining.

L. thinks that undoubtedly mesodermal elements penetrated into the optic nerve which correspond to the ocular cleft and produced a coloboma that extended for some distance backwards into the entrance of the optic nerve. The case does not contribute to the determination, whether the cause of coloboma consists in an active or passive behavior of the borders of the ocular vesicle or in an active immigration of the mesoderma. C. Z.

ORBIT

TRAUMATIC ORBITAL PHLEGMON.—DE HAAS, H. K. (*Tyds. v. Geneesk.*, October 7, 1914), showed an old man, who through an accident with a wagon had fallen in tree branches. He felt severe pain in the left eye, which appeared blind. On admittance a few days after the accident the wound, about one c. M. long of the upper lid had closed, marked exophthalmos, no light perception at the left, only direct right pupillary reaction. Choked disc at the left, which became within a week an atrophic one with blood circulating retinal vessels. Probably a branch had penetrated and torn the optic nerve deep in the orbit, as the central vessels had re-

mained undamaged. The slight redness and absence of edema or swelling of skin and conj. contrasted with the strong exophthalmos: the upper lid remained lax, movable. A retrobulbar hemorrhage seemed improbable. As a few days later the swelling did not decrease the wound in the lid was opened, pus escaped and some wooden slivers were extracted. Some weeks the wound was kept open and more slivers were discharged or extracted, some very deep at about 5 c. M. The swelling slowly disappeared, pus production stopped, the wound closed, normal mobility of the bulb returned. The temperature was normal all the time. The local reaction alone may be explained by other changes present. Patient can only partially open the mouth, because the right superior maxilla is swollen, which aches so much that it prevents him from sleeping. Already weeks before the accident to the left orbit he had pain in the right sup. max. for which he consulted his physician, dentist and rhinologist without avail. He had fever then, as he states. Irrigating shows the right antrum partly filled with pus. X-photo shows osteoporose of the right sup. max. A tumor of the right sup. max. is therefore possible with a chronic empyema, which mobilized patient's anti-bodies. Perhaps this could explain the limiting of the process to the left orbit.

E. E. B

PARASITES

ON OPHTHALMOMYIASIS.—BETH, L. (From the eye clinic in the University of Siena, *Klin. Mon. f. Aug.*, 54, p. 255), reports 5 cases of larvae of *Oestrus ovis* on the human conjunctiva. Human myiasis is very rare in Central and Southern Europe, relatively frequent in Russia and very common in the tropics. Myiasis of the eye may destroy the visual organ, or may be a slight affection according to the parts affected and the species of the larvae. B. considers the presence of larvae of *Oestrus ovis* as a benign form, as in his cases the larvae had no tendency to penetrate the tissue and to produce permanent changes of the tissue. While the most frequent cause of dermatomyiasis is the sleeping in the open, the benign ophthalmomyiasis, as in B.'s 4 cases, was due to the sudden flying of the insect against the open eye with such rapidity that a defensive movement was impossible. The immediate onset of ocular disturbances following the impact suggests that for some species it must be possible to drop larvae already formed. The patients complained of itching, burning and lachrimation, and presented the symptoms of acute conjunctivitis. The conjunctiva was red and swollen, and minute living organisms, very thin and elongated, of

white color, were found which showed vermiform movements. After instillation of cocain the movements were retarded and the larvae became detached, so that they could be removed with forceps or by suction into a pipette. Then the conjunctiva was irrigated with antiseptic solutions and yellow ointment applied. The symptoms subsided immediately. C. Z.

PATHOLOGY

SUNSTROKE AND HEATSTROKE.—SCHANZ, F., Dresden (*Munch. Med. Woch.*, November 29, 1915). Light changes the structure of the albumin molecule so that the easily soluble albumin becomes soluble only with difficulty. This holds true for blood serum as well as for lens albumin as S. pointed out previously. He found that the coagulation process is hastened by eosin, grape sugar and acetone. By analogy, he reasons that prolonged exposure to the sun changes the solubility index of the circulating blood serum, thus affecting the nutrition of the various vital centers and resulting in sun or heat stroke. This condition is favored by the use of foods containing eosin, grape sugar or acetone and by certain forms of wheat and maize. The whole idea is very fanciful. H. S. G.

CAN THE ORIGIN OF GLIOMA OF THE RETINA FROM THE PIGMENT EPITHELIUM BE CONSIDERED AS PROVEN?—REIS (From the eye clinic of Prof. H. Kuhnt in the University of Bonn, *Zeit. f. Aug.*, 35, p. 115), found in a case of glioma of the retina of a boy, aged 9, the same histological pictures as F. Deutschmann, but gives a more simple and plausible explanation of them. While Deutschmann believed to have observed that pigment epithelia were converted into tumor cells and hence concluded that the tumor originated in the pigment epithelium of the retina, R. found a marked separation between the tumor cells on the lamina vitrea and the pigment epithelium covering it. In concordance with the doctrine of Ribbert the tumor always grows from itself not from the surrounding tissues, and displaces or substitutes the retina more and more, lifting the pigment epithelium and advancing under it on the lamina vitrea. The progressive changes of the pigment epithelium which he also observed besides the tumor cells are a phenomenon frequently encountered in the most different pathological intraocular processes. Thus the observations of Deutschmann advanced as proof for the origin of glioma from the retinal pigment epithelium lack any conclusive value whatever in this direction. R. says that according to the modern views as to the origin of

glioma of the retina the question from which layer of the retina it starts has not much sense. As Ribbert showed, glioma arises within the area of the retina at from the time of development of the retina. It springs from cells, adrift neuroblasts, which get into abnormal layers within the retina and are excluded from the context of the retina probably at the first embryonic stage. Such a dissemination of germs may occur in the most different strata. Therefore the relations of the then developing tumor to the respective strata are only topic not genetic. If such a dispersion of elements of the retinal proton into the later pigment epithelium should occur, which cannot be proven on the fully developed tumor, the origin of a glioma in such a case could by no means be attributed to the pigment epithelium of the retina. C. Z.

CLINICAL AND EXPERIMENTAL INVESTIGATIONS ON PARALYSIS OF THE CERVICAL SYMPATHETIC NERVE.—METZNER R., AND WÖLFFLIN, E. (From the Physiological Institute in the University of Basel. *Arch. f. Ophth.*, 89, p. 308). 1. *Clinical part* by E. Wölfflin. W. gives a critical review on this subject and his own observations on persons, in whom the supreme cervical ganglion had been resected for therapeutic purposes. He found that the degree of ptosis corresponds to the degree of miosis. In one case the difference of the width of both palpebral fissures was at first 3 mm. and increased later to 5 mm. The direct reaction of the anisocoric pupils in light was normal in both eyes, in the dark decidedly retarded. Enophthalmus, which most likely is due to atrophy of the orbital fatty tissue, was never observed in recent cases. Of the other less constant eye symptoms W. found with the tonometer of Schöetz in some cases a minimal decrease of intraocular tension of from 1 to 2 mm. He never saw epiphora in his cases. In concordance with modern views W. assumes a double innervation of the lacrimal gland by the sympathetic and facial nerves. A fourth eye symptom, the aplation of the cornea, has not been sufficiently established by clinical facts, and the differences in the mobility of the membrane nictitans can hardly be considered in the human eye on account of its rudimentary character. W. found it spread out like a sail in his experiments on rabbits, but never was absolutely immovable. Depigmentation of the iris was occasionally observed. Also other trophic disturbances are relatively very rare. In the future more attention ought to be paid to the occurrence of mellituria, which was described by some authors. W. considers the cause of the great variability in the number of symptoms dependent upon the degree of the paresis, the different height of the diseased

portion, and individual variations in the nerve supply, which occurs to a much larger extent than in cerebral nerves. Then the vascular and sudoral symptoms are discussed. They last only for a short time while the oculo-pupillary symptoms always remain or subside only incompletely. So far all medication has proven without avail. W. considers trials with adrenalin and other sympathico-tonics indicated. C. Z.

PHYSIOLOGY

SOME EXPERIMENTAL INVESTIGATIONS CONCERNING INTRA-OCULAR PRESSURE.—MCLEAN, WM., New York (*Jour. Ophth. Otol. and Laryngol.*, June, 1915). The author refers to the work of von Schulten, Hill and Flack in particular. He constructed a manometer along the general lines used by these men with some improvements of his own. The needle which went into the eye was made of tapered steel, the opening being on the side. Two sizes were made one of .8 mm. in diameter for the anterior chamber and one of 2 mm. for the vitreous chamber. The needle was closed by a needle valve. After taking the tonometric and manometric pressure of a number of rabbits' eyes and one human eye he concludes that there is a difference in intra-ocular pressure in local and general anesthesia and that it varies with the depth of the anesthesia. In general anesthesia the intra-ocular pressure is lowered. He also finds that the scale of reading of the Schiötz tonometer and the manometer is considerably lower with the tonometer. M. B.

THE OBSERVATION POWER OF THE DAPHNIA-EYE FOR ULTRAVIOLET LIGHT.—VAN HERWERDEN, M. A. (*Onderzoekingen Physiol. Labor. Utrecht University, Vth. Reeks XV*), found in a culture, which she kept 4 years in the laboratory, a parthenogenetic female without an eye. The optic nerve was in its normal place, but nothing could be found of the large, single strongly pigmented eye. J. Loeb and A. Moore's experiments were repeated with the normal Daphnia's, which showed negative phototaxis, for rays of short wave length. The blind Daphnia was then examined with two of its normal young. She did not show any reaction against ultraviolet light, while at the same time the two young showed negative phototropism. The same day the experiment was repeated with the same result.

Experimentally v. H. succeeded to destroy with fine redhot steel needle the Daphnia eye under the microscope. She used four of the animals for experiment with ultraviolet light 24 hours after

the destruction of the eye. The movements diminished directly after the operation were again very lively, the heart action was normal, the intestine filled in the usual way with algi. In one specimen the ocular pigment was partly fallen in small fragments, in others only the motion of the eye had stopped and an infiltration of leucocytes had formed before the eye. These four artificially made blind, but for the rest healthy animals, behaved against the ultraviolet light of the Heraeus-mercury lamp absolutely in the same way as the blind *Daphnia*, found in the culture. None showed negative phototaxis.

v. Herwerden thinks, that the result of these experiments demonstrates satisfactorily, that the *Daphnia* eye contrary to the human eye, is able to distinguish ultraviolet rays. E. E. B.

THE EFFECT OF LIGHT UPON THE LIVING SUBSTANCE.—SCHANZ, E. (*Arch. f. d. Gesamt. Physiol.*, Vol. 161). In proof of the statement that light acts as a chemical irritant upon the living cell, Schanz quotes the experiments of Dryer and Hanson. These authors were able to show that the soluble albumins of the living cell coagulate under the influence of light of short wave length and become insoluble. Chalupecky obtained the same results, working with albumins obtained from the lens of pigs' eyes. Schanz followed the same line of experimentation, using blood serum and obtained the same end result.

Basing his views upon these experiments, Schanz believes that the light of short wave length affects the human lens and produces the condition of senile cataract. In youth, the lens is slightly yellow; with the increase of years this color deepens; and in old age, there is a distinct amber tint to the lens. He believes this color to be due to the absorption of blue and violet light. By using an enucleated eye, he was able to show that practically no light of wave length shorter than 4,000 Angstroms passed the lens, spectrometrically measured, whereas the daylight that reached the anterior surface of the lens was composed of a spectrum nearly twice the length of the spectral light that reached the retina. This marked absorption cannot be without effect, he claims, and the result is the condition of senile cataract. H. S. G.

REFRACTOMETRIC INVESTIGATIONS OF THE AQUEOUS HUMOR. A CONTRIBUTION TO THE BIOLOGY OF THE EYE.—LÖWENSTEIN, A., AND KUBIK, J. (From the eye clinic of Prof. A. Elschnig in the German University of Prag. *Arch. f. Ophth.*, 89, p. 199), found by exact methods the index of the aqueous of the normal rabbit.

measured at 17.5° C. under special precautions with the refractometer of Pulfrich, constant, from 20.5 to 20.8, from $n=1.335385$ to $n=1.335418$. As they had no reasons for the assumption that the albumen and salt of the aqueous fluctuate in opposite directions, that e. g. in an augmentation of albumen the constancy of the index is maintained by a decrease of the salt content, they surmised that normally the contents of albumen and salt of the aqueous are not subject to measurable fluctuations. Since from the constant value of the refracting index a constant composition of the aqueous seems proven, the authors studied a number of procedures, partly employed for therapeutic purposes, with regard to their action on the refracting index by refractometry as a method for detecting even slight alterations. They found that continued instillation of cocain or dislocation of the eyeball for a short time do not influence the index. Inspersion of dionin increases the index, which persisted after 6 hours, that of calomel or sand had no effect. Subconjunctival injections of physiological salt solutions and distilled water increase the index, due, as in subconjunctival injections of air, to mechanical irritation. Massage of the eyeball produces hypotony and considerable increase of index. Superficial traumatism, as abrasion of the cornea or cauterization, have no influence. Warm applications of from 30 to 55 minutes act very intensely, much more than diathermy, and congestive hyperemia in any form increases the index. Intravenous injection of salt solution (0.4) increases the index, those of dextrose 10%, distilled water, normal rabbit serum, diabetic serum, cornea serum not. Neither increase nor decrease of blood pressure have any effect. After puncture, and aspiration with the syringe, or with the knife a regular regeneration of the aqueous could not be observed. Loss of vitreous increases the index, which even if amounting to 1.2 ccm., is restored after 8 days. The index of the second aqueous of the dead rabbit scarcely differs from that of the first.

C. Z.

EXPERIMENTAL CONTRIBUTION TO THE BEHAVIOR OF INTRA-OCULAR TENSION AFTER INTRAVENOUS HYPERTONIC AND HYPOTONIC SALT SOLUTIONS.—HAUPT, W. (From the eye clinic of Prof. K. Wessely in the University of Würzburg. *Archiv. f. Aug.*, 28, p. 359), reports on 30 experiments on rabbits, in which besides the intraocular tension not only the blood pressure was simultaneously measured, but also the changes of distribution of the blood by registering the fluctuations of caliber of the blood vessels of the head. One eye was connected with the registering mano-

meter of Wessely, the contralateral carotid with Gad's kymographion. The ear, corresponding to the experimental eye was covered with a glass globe, fastened air tight to the skin with strontium sulfide, and connected with a Marey's capsule. After injections of 5% salt solutions the intraocular tension declined by from 25 to 50% of its original height, and most frequently parallel with it the blood pressure fell to about 50 mm, sometimes however hardly noticeably. After injections of hypotonic salt solutions 0.1% in quantities of 225 ccm. the intraocular tension ascended in the first few minutes by up to 8 mm. Parallel with the ocular curve the plethysmographic auricular curve always rose immediately, whereas after hypertonic solutions only in a portion of the experiments, but then there was also a marked parallelism in the descents of the eye and ear curves, even in those experiments in which the blood pressure remained almost constant. H. emphasizes the great variations of these phenomena. The tension does not always decrease, even after abundant injection of hypertonic solutions, e. g. of 10%. The osmotic relations cannot differ so much in the single case to explain this. Hence it is at least probable that in influencing the intraocular tension by hypertonic and hypotonic infusions, aside of osmotic, vasomotor factors must play a part. Above all B.'s results again show that in all investigations on the intraocular tension not only the blood pressure but also the distribution of the blood in the body must be considered. C. Z.

REFRACTION AND ACCOMMODATION

REFRACTION OF MENTALLY DEFECTIVE CHILDREN.—BEALS, M. B., New York (*Jour. Ophth. Otol. and Laryng.*, June, 1915). In the public schools of New York City the children who are decidedly backward in school work are gathered together in sufficient numbers to form a class, which is termed the ungraded class. These classes are composed of children of all school ages and all degrees of mental deficiency ranging from low forms of idiots to children who are simply backward because of physical defects, as high degrees of refractive errors. The author estimates that in the public schools of New York there are more than fifteen thousand ungraded children and many more thousands of backward and incorrigible children and that it is safe to say that not five per cent. have glasses. Judging from the author's experience in examining 242 of these ungraded children most such children not only need glasses but are materially improved by their use. He prescribed glasses for 117 and of these 132 were finally provided with the

glasses prescribed and their use was followed by varying degrees of improvement in mentality, from slight improvement in their work, which depended upon vision, up to astonishing progress, to such a degree that the children were able to go into the class and grade of their age.

Out of a group of thirty-eight who were diagnosed at Dr. Schlapp's clinic as belonging to some of the several types of idiots he reports the histories of twelve, they read like tales of magic and we regret that this abstract will not admit of their review.

The author points out that a great saving to the state is possible by having the eyes of all these defective children examined; since by so doing it is possible to save them to society as useful citizens.

M. B.

THE ADMISSION OF MEN WITH GLASSES INTO THE ARMY.—BRADBURN, A. A., Manchester, Eng. (*Brit. Med. Jour.*, May 22, 1915). The writer calls attention to the fact that the advisability or otherwise of permitting soldiers to wear glasses is at present engaging the attention of those with whom recruiting lies. It is a complex problem on which much can be said both for and against. It is, moreover, one which is dependent upon two main factors—namely, the supply of normally-sighted men and the exigencies of active service, which interfere so greatly with the employment of glasses and their replacement when broken. The military require an absolutely sound man, not only to save trouble or expense when he becomes sick, but to prevent him from possessing any loophole whereby he can shirk his duties; thus a would-be shirker has only to break or lose his glasses to obtain his desires.

Suitable work could be found for the soldier with glasses; he could do clerk's work; the difficulty of replacement of glasses in active service could be overcome by the establishment at the base of an optician among the hosts of repair shops, etc., in the rear of an army.

The question of the admission of recruits with an optical visual error would be dependent upon two factors: (1) The nature of the defect, and (2) the type of recruit. The first factor could be considered under three heads: (a) If the defect is of such a nature that without glasses the recruit is practically helpless, he would be considered unfit for military service, except for home service as a clerk. (b) When the same condition affects one eye only, the other possessing fairly good uncorrected vision, he could be admitted if the lesser error were a slight one. (c) When the defect is such that glasses change fairly good sight in both eyes into

normal vision with either eye, there would be little objection to his employment. Under the heading "Type of Recruit," would have to be considered. (a) previous experience with glasses, this having resulted in a higher standard and knowledge of how to care for the glasses; (b) the particular branch of the service in which the recruit wishes to enlist; and (c) the general physique and excellence of the individual.

C. H. M.

AN OBSERVATION REGARDING THE THEORY OF EMMETROPIA.—SCHOUTE, G. J. (*Tyds. v. Geneesk.*, November 1, 1914), refers to the theory, which Straub published in 1909, to explain Emmetropia, the condition the explication of which has been neglected and which should have been the starting point for further investigation. The plurality of the eyes of the young born is hypermetropic. Life makes them, if they remain normal, emmetropic. This order, which arises, demonstrates a purpose, which is to distinctly see remote objects. The central organ of binocular vision regulates it, especially the curvature of the lens. The ciliary muscle is innervated until a tonic contraction occurs which is just sufficient to give the lens the required curvature; if this curvature is already too strong, then the ciliar muscle becomes so much distended that the intra-ocular tension stretches the limbar region somewhat and the lens becomes flattened sufficiently. In the beginning the adjustment of the form of the lens is dynamic, but becomes greatly static as experience slowly produces a connection between the distance-sensation and the innervation of the ciliary muscle. The ciliar muscle grows about as much as the aim wants, so that the mentioned tonus becomes nearly entirely superfluous; so the eye becomes modeled to be able to focus parallel rays on the retina. The experience produces a similar connection between the distance-sensation and the innervation of the external ocular muscles, so that besides the ideal refraction also the ideal rest position, the parallel visual rays is acquired under the direction of the binocular vision.

This binocular vision, indicated for the first time by Staub as the psychic function, which governs the emmetropisation and direction of the visual lines, has to shield during life the eye against unwished for changes of form and place. According to the theory as to the origin of myopia, it says that who feels a strong stimulus to see sharply in the distance, will not be made myopic by school work; who is indifferent as to the outside world falls an easy prey. As to the hypermetropia the theory must explain, why the normal emmetropisation may remain behind; who has by nature a weak

binocular vision will have a very insufficient distance determination. If the experience does not produce the exact connection between the distance sensation and the innervation of the ciliary muscle, then the eye cannot become emmetropic and will remain in its congenital hypermetropic condition; the same can be said of the convergence muscles as explication of the non-attained ideal rest position of the eyes, the squinting of the hypermetropes; also the insufficient vision, the one-sided visual weakness, the dissimilar refraction, in short all symptoms of the hypermetropic condition can be explained through congenital weakness of the binocular vision.

Straub has proved his theory chiefly with statistics. About one point the material is not so large as one could wish for: When the question is put, if hypertropes possess actually a weak binocular vision, Prof. Straub states that this is certain regarding very many hypermetropes and he describes different kinds to prove it. But one misses a statistical group of persons with normal refraction besides with refraction anomalies for comparison of their binocular vision. And the quantitative determination of the binocular vision does not go further than the consideration of the number of mistakes made with fall experiment of Hering. Schoute considers it important to investigate the exactness of a weaker binocular vision with hypermetropes, not only to fill in a gap in the demonstration, but also as it is the test of the theory: if the theory is right emmetropics must prove better binocular vision than those where the process has failed. He only compared emmetropics with hypermetropics, who all possessed normal vision for distance without glasses and with parallel visual lines. The fall experiment of Hering measures not as much the acuteness of binocular vision as the velocity, wherewith one knows how to use it. Schoute determines with his method the acuteness of binocular vision. He puts the patient at a distance of 5 to 6 meters of two white threads, the upper and lower ends of which are invisible and now moves one fore or backward, so that the observer with head fixed can tell exactly the difference in distance. One has a measure for the acuteness of the binocular vision in this distance between both threads. At this distance the difference of the pupillary distance can be neglected. He examined 130 emmetropes and 201 hypermetropes, who had normal vision in each eye and parallel visual lines. He found that the Hyps. did not see as sharply binocularly as the Emms., but the difference is slight. This is not in contradiction with the theory. Comparing 117 Hyps. with 0, 25, 0. 5, and 0. 75 D. with 84 Hyps. of 1 to 3 D. he found that the weakest degrees

of Hyps. possess a slightly better binocular vision than the higher ones. A comparison of Emms. and Typs. who both have deviation of the parallelism of their visual lines must demonstrate a binocular vision less sharp than normal and less good for the Hyps. Schoute could compare a small group where the visual lines did not deviate more than 2° . The binocular vision was less sharp for the Hyps. and also when the visual lines deviate more than 2° . The lowest degree of binocular vision is already sufficient to make the eye irreproachably emmetropic. If one sees, how large the number of Hyps. is with a good binocular vision, one receives the impression, that emmetropisation happens only when the consciousness makes a good use of the binocular vision; good binocular vision alone is not sufficient. As we have seen, that emmetropisation in some cases will succeed with even weak binocular vision, then we learn to appreciate the great power of the consciousness, which, when it is only on its guard even with rudimentary binocular vision, can produce the emmetropic eye.

For the analysis of the binocular visual acuity the influence of the consciousness must be taken into account. For this purpose the results with Hering's fall experiment have value. Its results speak in favor of the theory. Schoute made the distance at 5 M. between the two white threads 5, c. M. and had a black screen with large square opening swing before them, so that they could only be seen as long as the opening in the screen left them uncovered. The threads were shorter visible, as the amplitude of the swinging was larger. Determinations could be made of 1/25, 1/15, 1/10, 1/5, and $\Delta 1/5$ second. The Emms. have made better time than the Hyps., which is accord with the theoretical expectations. Schoute proved, that the binocular vision in Hyps. is developed not as strong as with the Emms. and that the part of the consciousness is of the greatest importance. Perhaps we may say that for the understanding of the weak binocular vision of the Hyps. "the consciousness is the chief prime factor cause." E. E. B.

RETINA

RETINITIS OF PREGNANCY.—FISHER, J. HERBERT, London (*Med. Press*, June 23, 1915). At a meeting of the section of Ophthalmology of the Royal Society of Medicine, June 9th, 1915, the author read a paper on "Retinitis of Pregnancy." He presented the view that this type of retinitis was not essentially albuminuric, but rather due to toxic products in the circulation. Syncytio-toxins—products of the disintegration of the syncytium cells—has been

found in these cases, and these cells immediately connected the foetal with the maternal structures. The author proceeded to give particulars of a series of typical cases of the condition which had been under his care.

J. M. W.

DETACHMENT OF RETINA CURED BY GALVANO-PUNCTURE OF SCLERA, COMBINED WITH SUBCONJUNCTIVAL INJECTION OF MERCURY CYANIDE.—JONES, E. L., Cumberland, Md. (*Ann Ophthalm.*, July, 1915). Two cases are reported of well marked retinal detachment in which the sclera was punctured with a galvano-cautery electrode after sliding the conjunctiva with forceps so that upon releasing it, it would cover the scleral hole. Two cases are reported where very good results were obtained.

M. B.

RETINITIS EXUDATIVA.—PIEKEMA (*Tyds. v. Geneesk.*, August 8, 1914), shows a patient with doubtful diagnosis. Patient, a young man, began slowly to see worse. In the macular region a slightly prominent focus, round, yellowish gray, which showed at its border turned toward the disc a spot shining as mother of pearl. The center prominates more than the sides. In the beginning the focus showed numerous shining crystals (cholesterol). The focus had always the same color; has only diminished in size. In the beginning a few small hemorrhages in the retina were visible around the focus, which have disappeared and left behind white spots. The focus shows two from above and below toward the middle going vertical blood vessels. Nothing appeared of traumatism, tuberculosis, acquired or congenital syph., echinococcus a. s. Discussion.

Van Genus considers it to belong to the group of retinitis exudativa coats, as he himself saw and described in 1905. In his case the chorioid had become entirely sclerotic with the exception of a zone, where no exudate in the retina had been visible and where this sees at present still pretty normally.

Van der Hoeve saw a similar case in an old man about 4 months ago. A grayish focus was present in the macula similar to the demonstrated, in the retina and vitreous numerous cholesterol crystals, while the other eye showed typical subretinal hemorrhages, so that as cause was accepted, hemorrhage between retina and chorioid.

Piekema states that the slow origin of the visual diminution is not in favor of the primary existence of a hemorrhage. Never also was any vestige of staining through blood to be recognized, the focus was always yellow-gray.

Snellen thinks of tuberculosis.

Pickema fears it also. Although no organic changes can be found (outside the eye) which point at tub., patient begins to look less good, although he feeds himself well. E. E. B.

RETINO-CHORIOIDITIS JUXTAPAPILLARIS.—VAN DER HOEVE, J. (*Tyds. v. Geneesk.*, August 8, 1914), observed the following case of Edmund Jensen's disease. Healthy girl, Wass. neg.; Pirquet Pos. without tuberculosis symptoms. In 1905, 16 years old, she experienced her first affection of O. S. She complained of poor vision: V. O. D.=6/6; V. O. S.=6/12. We may expect good vision in both eyes before the attack. The disease recurred in O. S. at the same time with an attack in O. D. in December, 1905. It was then called neuritis optica. In November, 1912, another recurrence in O. S., a few praeipitates were observed, V. diminished to 1/60. The diagnose was neuroretinitis. On March 30, 1914, she complained, that she was seeing worse during the last days and she showed now the typical symptoms of Jensen's disease: the whitish elevated infiltration at the pupillary margin, partly covering the vessels, while some at that place changed in caliber, and vitreous opacities were present. The field shows a large sector defect from the blind spot until the lower periphery, which is absolute. Besides small whitish foci, similar with the large focus with slight pigment changes, were present in the macular region. T. constantly N. V. had remained since the first attack 6/18 a 12 f., only greatly less during the attack. During the last one V. O. S. was on March 25 6/36, on April 4 6/36, on April 8 6/24 g.; April 11 6/18, May 4 and 24 6/12 f. On May 24 the focus had become atrophic with slight pigmentation, while also in the macula the infiltration had disappeared and some pigment changes remained behind. O. D. did not show any changes, V. was 6/18 with +1=5/12 f., the field taken with a 15 mm. object at the perimeter at 35 cm. distance was N., with a 2.5 mm. object it showed a defect, nearly symmetrical with the one of O. S. The same was observed on Bjerrum's screen: with small objects a scotoma from the blind spot till the periphery, large objects are not observed in it; the defect of the nerve fibers showed therefore serious lesion. The presence of this scotoma demonstrates that the only attack of this eye in 1905 was one of Jensen's disease.

It is more observed that a scotoma is not absolute in defects of the nerve fibers. The absence of ophthalmologic changes in O. D. demonstrates that the chorioidal change can be only slight, as is a priori to be expected. The essential here is the change of the layer

of the nerve fibers in the retina, which probably can run without chorioidal affection if Groes Petersen's hypothesis is right, that in Jensen's disease an infection of the retina originates from out the retinal vessels, while in disseminated chorioido retinitis an infection of the posterior ciliary vessels attacks the eye. Van der Hoeve rather, therefore, likes to call the condition "neurofibrillitis retinae."

This case demonstrates that the process can be located centrally, which influences the prognosis. In six out of the twenty-five eyes the prognosis could not be favorable without restriction.

Discussion.—Nicolai thinks to have under his care a similar condition. The swelling in the affected retinal region, however, is such that he thought to have to deal with a detachment of the retina. He saw improvement after K. J. Van der Hoeve thinks that swelling can be present. A few of the described cases have been accepted as tuberculosis. It could then be a large solitar tubercle. He himself saw such a condition, thought to be a solitar tubercle, at the papil with a scotoma, which reached from the blind spot till the periphery, combined with severe swelling.

Snellen has under observation a girl with a retinal picture similar to Nicolai's where also Descemetitis is present. He considers it to be tuberculosis. The process is located in the macular region and is clearly an inflammatory tumor with much swelling.

Van der Hoeve: Descemetitis proves nothing against the diagn. retino-chor. juxtapap. Among the cases described by Groes-Petersen some showed desc. spots and the case he described had these precipitates in 1912.

According to Groes-Petersen the inflammation starts from out the vessels, attacks the middle of the retina to progress towards both sides in the chor. and the nerve fibers layer. Therefore these cases are also mostly solitar.

E. E. B.

ON RETINO-CHORIOIDITIS (EDW. JENSEN).—RÖNNE, H., Copenhagen (*Klin. Mon. f. Aug.*, 54, p. 455), reports two cases. One contradicted the assertion of van der Hoeve that the upper temporal quadrant of the visual field is always preserved. Both confirmed the observation of van der Hoeve that (1) the disease may be localized at the macula as well as at any other part of the fundus, (2) the defects of the nerve fibers may be relative, although rarely, (3) the disease may be mistaken for optic neuritis, (4) it need not leave atrophic changes of the chorioid, although R. thinks that the chorioid is the primary seat of the disease. The disease is not rare in the acute stage, frequent after it has run its course, in about 1 per cent of all patients. It is not tubercular, but may have been

confounded with tuberculosis of the chorioid. It may be found more easily if the visual field is examined in all cases of isolated chorioiditis or chorioidal affections at the posterior pole, especially at the border of the disc. C. Z.

ANATOMO-PATHOLOGICAL AND EXPERIMENTAL INVESTIGATIONS TO THE KNOWLEDGE OF PRIMARY TUBERCULOSIS OF THE RETINA.—OTORI, KAIZO, Japan (From the eye clinic of Prof. C. von Hess in the University of München. *Archiv. f. Aug.* 79, p. 44), found in literature only three cases of primary tuberculosis of the retina and five cases of tuberculosis of the optic nerve, which are given in abstract. In none of these tubercle bacilli were found and the diagnosis was made from biological, respectively histological, findings.

He then reports the clinical histories and anatomical examinations of the eyes of two cases of his own observation, in which for the first time tubercle bacilli were found in the retina, after staining the sections according to his modified method, which is described. The retina was very much changed and showed a few tubercles of characteristic structure with typical giant cells of Langhans, and between the tubercles epitheloid cells, while the vessels, especially the veins, were surrounded by infiltrations with round cells. The tubercle bacilli were found only in the retinal tissue in places where it was relatively little changed, viz., at the equator, and were very numerous in the perivascular infiltrations of the periphery, whereas there were none in the uveal tract. As Gilbert pointed out, this throws light on another retinal affection in tuberculous individuals, viz., the periphlebitis retinalis adolescentium. Especially it proves that the perivascular round cell infiltrations of the retinal veins, frequently observed in the most different acute and chronic intraocular inflammations are not only secondary, a phenomenon of irritation, but that the transport of the tubercle bacilli in the venous sheaths itself elicits inflammation and thus the foci of round cells.

For a possible positive proof of tubercle bacilli in the retina in experimental intraocular tuberculosis, O. injected bacillar emulsion into the common carotid or auricular vein of rabbits with and without ligation of the common jugular vein or cutting of the ciliary vessels, selecting for these different variations groups out of fifteen healthy animals. The tuberculous process always occurred in the uvea, especially in the chorioid. In some of the animals tubercle bacilli were found in the retina.

O. concludes that the rare occurrence of primary retinal tuberculosis depends not alone upon the scanty quantity of blood or the

greater velocity of the blood current in the retina, but also upon a certain indisposition of the retina, for primary tuberculosis. He believes that the primary process in his cases consisted in perivasculitis of the retinal veins, and this was not a reactive phenomenon to the toxic irritation, but was directly caused by the tubercle bacilli, carried from the infectious source in the thorax by the lymphatics into the retina. C. Z.

SYMPATHETIC OPHTHALMITIS

ON NECROSIS IN THE EXCITING EYE IN SYMPATHETIC INFLAMMATION.—MELLER, J. (From the eye clinic of Prof. E. Fuchs in the University of Wien. *Arch. f. Ophth.*, 89, p. 248), reports the clinical histories and histological conditions of the eyes of two new cases of sympathetic ophthalmia, which showed necrosis in the exciting eyes, the occurrence of which has so far been emphatically denied. In both iris and ciliary body were supplanted by a tumor of granulation tissue, consisting of nodules of epithelioid cells and numerous giant cells, surrounded by a wall of lymphocytes. The interior of many nodules was filled with detritus with minute granules and lumps of pigment. This necrosis was due to complete obliteration of the vessels. The tumor extended to the ora serrata, crowding the retina towards the interior. In the parenchyma of the chorioid were also nodules of epithelioid cells surrounded by densely accumulated lymphocytes, which farther backwards caused a more uniform thickening. The optic disc was very much swollen, a neuritic ridge displacing the retina. The central vessels were surrounded by small celled infiltration and on the inner surface of the disc was a fibrinous exudation.

In the second case was also a granulation of iris tumor and ciliary body filling the whole anterior segment of the globe, consisting of epithelioid cells and extraordinarily numerous cells of which many were of the Langerhans type. The necrosis occurred chiefly in the epithelioid cells. The retina showed, aside of moderate perivascular infiltration, no inflammatory changes. The disc did not participate in the process, except by a moderate edematous swelling. It was covered by a nodule of organized exudation from the region of the central vessels. By propagation along the optical canal specific nodules of epithelioid cells had accumulated in the blind end of the intervaginal space, and the optic stem contained 8 mm. behind the eye a small nodule of epithelioid cells.

Through the discovery of necrosis in these cases one of the most important points of discrimination between tuberculosis and the

products of sympathetic inflammations has been removed and the question revived of relations of sympathetic inflammation of the exciting eye to tuberculosis, which is discussed in detail, and answered in the negative by comparing the remaining histological and clinical dates. Tubercle bacilli were never found in the most exuberant uveal exudations, and the numerous attempts of implantations into animals receptive for tuberculosis were not successful. Both diseases have in common that sympathetic ophthalmia has a predilection for children as well as tuberculosis of the iris, which is most frequent up to the sixth year, and in a number of cases followed an injury. M. says that all this is not sufficient to render a connection of both diseases probable, but that it may permit of claiming a bacterial origin of the inflammation in the exciting eye.

C. Z.

TOXICOLOGY

ARE THE USE OF NAPHTHALIN AGAINST THE LICE PEST AND NAPHTHALIN VAPORS NOT INDIFFERENT FOR THE VISUAL ORGAN? —AXENFELD, TH., Freiburg (*Klin. Mon. f. Aug.* 54, p 511). Upon the recommendation of Prof. A. Blaschko, Berlin, the German troops in Russia are provided with bags filled with from 5 to 10.00 naphthalin, which they wear between shirt and uniform for protection against the lice pest. A. was asked for an opinion whether eye lesions, as observed after ingestion of naphthalin, might hereby be caused. According to A., there exists only one certain case of (partial) cataract in a man thirteen hours after taking 5.00 of crude naphthalin per os. Also in the experiments on animals much higher doses produced changes of the lens and retina, than could be communicated from the bags. Van der Hoeve could in rabbits not attain an intoxication by vaporization of naphthalin. The only publication of an ocular lesion by employment of naphthalin in a trade, by van der Hoeve, was a unilateral chorioiretinitis in a man, who after accidentally bringing naphthalin into this eye noticed a visual disturbance two months later. As the affection of the fundus may have existed for a long time it is very doubtful whether it was caused by the external transmission. A report by Dr. A. Spilker from a tar factory in which naphthalin is sublimated in large quantities, said that the common refined naphthalin in decades of manufacturing had no deleterious influence, although the workmen are daily wrapped in naphthalin vapors and their clothes covered with naphthalin crystals. Nor was an introduction of pure naphthalin into the human body up to several grams, as it often occurs

in the laborers with their meals, ever detrimental to their health. The mucous membranes, especially of the eyes, are transiently irritated by the naphthalin vapors, which ceases with the cessation of the exposure. It may perhaps be different with crude naphthalin by the admixture of phenoles, naphtholes, etc.

Hence pure naphthaline to the extent of its practical use is not injurious. C. Z.

TRACHOMA

TRACHOMA IN INDIANA.—SHANKLIN, E. M., Hammond (*Jour. Ind. State Med. Assoc.*, June, 1915). I recently requested about ninety physicians, devoting all or a part of their time to eye work, to answer a series of questions relating to trachoma. I received replies from about seventy of this number. The questions were as follows:

1. Has your city any considerable foreign population?
2. Is trachoma prevalent in your city?
3. How many cases do you see yearly?
4. Are these cases among the native or foreign population?
5. Do you report these cases to the board of public health?
6. What restrictions, if any, should be placed upon trachoma cases?

The first question was to bring out the relation of trachoma cases to foreign population. Except in the great manufacturing districts in the northern part of the state and in Indianapolis, this factor does not enter into the question to any appreciable extent. In the southern part of Indiana we find a great number of trachoma cases, practically all among the natives. Question 2 brought a variety of replies, some paradoxical. As an example, four men reply from the same city, and one of our smaller cities at that; three of them say trachoma is not at all prevalent, and yet the four report more than 200 cases seen yearly!

The total number of cases reported is about 1,400, with the larger percentage in the southern district. Over 60 per cent of the cases are reported as occurring among natives and less than 20 per cent among foreigners, the remaining 20 per cent reported as occurring in both.

In the matter of reporting trachoma to the boards of health, just six men of the list of seventy are reporting their cases; three of them having begun to do so in the past few months. I was not aware that these cases were reportable until a short time ago. A letter of inquiry to Dr. J. N. Hurty, secretary of the Indiana State

Board of Health, brought the reply that trachoma had been placed on the list of reportable diseases and that cases not under active treatment should be quarantined.

In answer to Question 6, relative to the regulation of trachoma, practically all were agreed that something was necessary, though one or two misguided souls, judging from their remarks, were of the opinion that "we should worry" when it comes to trachoma. The idea of a printed circular concerning trachoma and its dangers to be issued by the State Board of Health and handed to all trachoma patients is suggested by many. Isolation, though conceded to be impracticable, is suggested by a large percentage. Keep trachoma cases out of schools, is the very good suggestion of a large number. Personally, I believe that the sooner we all report our cases the sooner will the question of what to do with trachoma be answered by the State Board of Health.

If all cases are reported, and from 1,200 to 1,500 are recorded yearly, how long do you suppose our good friend Hurty will stand for it? As to the number of cases in the state, no one can answer: the 1,400 cases reported to me as seen yearly are but a small percentage of the real number we have. In my count I believe we have, when industrial conditions are normal, about 300 cases. Basing my figures on the reports received from over the state, various statements from health officers and from other sources, I believe that 5,000 is a very small estimate of the number of trachoma cases in Indiana.

Now what about the economic phase of trachoma? First, as to the cost to county and state, it is estimated that it costs the state \$3,000 to educate a blind child. (Illinois estimate.) Geo. A. Wilson, superintendent Indiana School for the Blind, reports four cases of blindness due to trachoma in his institution. He says, "applications for admittance are filled out by the parents and are not absolutely reliable." Even four cases, at an approximate expense of \$12,000, represent too much money paid out for a preventable condition.

The greatest cost is not to the state, however, but to the county and the individual. Trachoma victims are rapidly appearing in the reports of many of our county asylums for the poor and needlessly, too. In many cases intelligent, thorough and persistent treatment will get these cases out of the poor house. One case may be cited as showing what may be done in this way: Milan came to America several years ago. We believe he contracted trachoma in a Gary boarding house. After about two years of haphazard treatment he was practically blind and was sent to the poor farm. Here, after a

time, his left eye was enucleated, probably on account of pannus. The right eye continuing to fail, the superintendent asked the commissioners for permission to consult an oculist, which was granted. The case was operated and after several months' treatment the man was discharged practically cured, and has since earned his living. His age being about 30, it is easy to estimate the cost of providing for him the balance of his days had he not been cured. Many similar cases are no doubt to be found in our poor asylums throughout the state.

Under a recent ruling by one of our large steel corporations no person with trachoma is given employment and old employees found thus afflicted are dismissed until such a time as they are cured. I have recently had several cases of injury to one or both eyes in which it was a pretty problem to estimate just how much damage was done by the injury and how much was due to trachoma. In two of these cases, had the corporation made a practice of thorough examination of all applicants for work, enough would have been saved to provide for such examination for several years.

Publicity is our greatest asset in fighting trachoma. We must assure the laity and some physicians as well that trachoma is a dangerous contagious disease, and that it is communicated chiefly through the use of a common towel, handkerchief, etc. Physicians should be urged to cease using the term "granulated eyelids" for any and all lid affections, as this is a most pernicious habit. Such a diagnosis given in a case that clears up in a few days naturally impresses the patient that granulated lids is an affection of little consequence. I frequently find it no little task to convince a trachoma patient that he has a serious disease, once he is told he has granulated lids. Thus it may be seen that there is need of a campaign of education among our own profession.

In conclusion, I would make the following suggestions:

1. We must give more publicity to trachoma and its dangers.
2. Our cases should immediately be reported, that the health authorities may be apprised of the real trachoma situation.
3. Our committees on conservation of vision should urge those making public addresses on conservation to go thoroughly into this subject.
4. Finally, let us get away from the habit of using the term "granulated lids," as applied to any and all lid affections.

H. V. W.

IS THERE IMMUNITY FROM TRACHOMA?—AXENFELD, TH., Freiburg (*Klin. Mon. f. Aug.*, 54, p. 121), mentions the much discussed

and long ago decided questions that there is no human race or climate immune from trachoma only because still papers are published in which the climatic influences are overrated. With regard to the personal immunity, A. first gives a very interesting essay on the meaning of immunity in its relation to infection. The taking hold of the infection in the conjunctiva by the trachoma germ, if this is immovable, must under natural conditions occur through its entrance into the epithelium, and the pre-disposition of the conjunctiva for certain micro-organisms must be that these exert a special stimulus in the epithelia for phagocytosis. Unevenness of the surface in the niche of which the material resists longer presence of mucus which may enwrap and thus longer retain the germs, other existing inflammatory elements, rubbing, to which persons suffering from conjunctivitis are tempted, may favor the process of taking hold. Herein lies the predisposition of pre-existing conditions of irritation. A. believes that, according to the interesting observations of Mijachitas and Meyerhof which are described, in unilateral trachoma the healthy eye must not be considered as perfectly immune, nor that a person who has remained free for a long time is not receptive for virulent material. But he shows that relative immunity under certain possibilities is hereby not excluded. Relapses in eyes, which had been considered cured, are according to Kuhnt and Lindner in a large percentage reinfections, and Meyerhof decidedly contends that there cannot exist an acquired immunity. Others, e. g., Warschawsky, assume such an immunity, because in the Caucasus adults, who as children had trachoma, are relatively rarely reaffected. Therefore Axenfeld leaves this question open. He then discusses the experiments of artificial immunization in men and monkeys. The prospects of a specific immunization therapy are very little favorable, but A. leaves it undecided how these attempts will be, if the morbid agent of trachoma is at disposal ad libitum.

C. Z.

TUMORS

A CASE OF SARCOMA OF A SOCKET.—CLEGG, J. GRAY, Manchester (*Ophth. Review*, June, 1915). The writer reports the formation of a sarcoma following the enucleation of the eye of a patient 40 years of age. He leaves the inference that no sign of malignancy was present before enucleation. On removing the artificial eye which had been worn for seven years, a large granular, red mass could be seen in the outer portion of the socket. Pathologists agreed that the growth was malignant. The orbital contents were removed

in one mass. A few Theirsch skin grafts were introduced, and excellent healing took place. Mr. Parsons and the author believed that irritation from a crack in the glass eye may have been the cause of the malignant growth.

J. M. W.

METASTATIC CARCINOMA.—NICOLAI, C. (*Tyds. v. Geneesk.*, March 27, 1915), reports the following case: Mrs. complains about a haze before the left eye since three weeks. She is 33 years old; this is on December 4th, 1912. Her left breast was removed for carcinoma last January. O. D.=N. V. O. S.=0, 5/60, disc hazy edematous at its lower part. On December 10th the edema has increased, detachment of the retina, which is total on January 7, 1913, when T. is enlarged and the eye painful. The tumor has a flat cakelike shape, is extended over the disc, taking the entire retina in, which is entirely detached. The retina proper, however, is not involved. The tumor mass has everywhere remained below the lamina basilaris of the chorioid. Of the chorioid only a few pigmented parts can be seen. No distinct limit between tumor and sclera. The retina is detached by exudate, of the vitreous hardly anything is more visible. Lens and iris are pushed forward so that the iris lies against the cornea. Weak enlargement shows the alveoli distinctly in the form of glandular tubes. The spaces around the cells stain yellow after Van Gieson. In this yellow mass, which is blood, much detritus is found. Little connective tissue between the alveoli. No tumor tissue in the sclera. In the disc many cells, the nuclei of which resemble much those of the tumor tissue. The cells lie here in large and small quantities within the nervous tissue, pressed against each other so that one can not speak of tubular formation. The peculiar large, round nuclei, in which one or more very distinct nucleolar bodies, do not doubt about the identity. The cancerous cells seem to have spread along the lymphstream: in some specimens cells are lying sling-like behind each other, which represent probably the course of the lymph vessels.

J. van der Hoeve reports two cases of metastatic carcinoma of the chorioid. His predecessor, Prof. Mulder, had not seen during 35 years one single case of carcinoma chorioideae, while he saw during the first four months two cases with metastatic chor. carc. The first one had a carcinomatous breast removed in 1912. In 1913 metastases in the sternum. She began to see stars before the left eye and the objects looked yellow. Examination at that time was negative. Slowly the eye became blind. In August, 1913, the left eye was red and somewhat painful. She had noticed since two days with O. D. the same yellow color as previously with O. S. V. O. D.=

6/24 with -1 , $5=6/8$, visual field $=N$. No changes in the fundus. V. O. S. $=O$. T. $=+2$, yellowish red reflex: no translucency with Sachs lamp. In September the condition of O. D. had not changed; the media of O. S. were less opaque and a tumor was visible. Patient died in December, 1913, before O. D. had become blind. No post-mortem. The general poor condition and the little trouble she had from the invaded eye contra-indicated enucleation, especially as metastatic chor. carc. never appears alone, but is combined with metastases in other places. The second patient had a cancerous breast with glandular metastases removed in November, 1911; local recidive in 1913 and metastases. Since August, 1913, pain in and over O. D., vision diminished, first the temp. part of the field disappeared, then the eye became entirely blind. T. was increased and through the pupil a tumor could be seen, the enlargement of which could be followed. The eye was removed in December for heavy pain. V. O. S. $=6/4$ f. V. O. D. $=O$. The pupil of O. D. was larger than the left, in the lens peripheral opacities. The nasal side of the retina was detached without folds, the temporal side with folds. T. $=40$ mm. (Schlötz). Sachs lamp illuminates the pupil good if placed below or above, poor from the temporal, hardly from the nasal side.

Patient died in November, 1914, without complaints from O. S. acroscopically the tumor in the enucleated eye has a dish form, reaches the aequator. The retina is entirely detached, vitreous hardly present. The formation of the tumor is identical with that of the primary tumor of the mamma and the glandular metastases. The tumor remains below the limiting membrane of the chorioid: only in one place the distension of the pigment layer was too much and a large hiatus was formed. The epithelium strands have progressed far in the nerve, until near the place where it was cut. In the papilla typical epithelium strands, while on the pupil tumor mass is seen in folds, the retina seems to be free. The tumor is much more solid in the chorioid than on the papil, where it lies more in folds surrounding cavities, an observation which can be made also in many cases of sarcoma chorioideae. However, in both cases the tension was elevated, although glaucoma appears rarely with carc. chor., far oftener with sarc. chor. E. E. B.

A CASE OF TUMOR OF THE IRIS WITHOUT DIAGNOSIS.—KUYNDERS, H. J. (*Tyds. v. Geneesk.*, March 27, 1915), shows an eye with an iris tumor from a 62-year-old man, who came in the chirurgical clinic with a probable stomach carcinoma. A tumor could not be palpated. He voided, however, alkaline urine with pus, and had an

enlarged prostate without bladder complaints; catheterization impossible. A week later a bladder fistule is made, after which the stomach complaints disappear. Patient makes good progress; the renal function appears to be good, and as the bladder fistule does not close by itself three weeks later the prostate is removed, which was very difficult. The microscopical picture is that of glandular hypertrophy. Patient becomes worse, passes through an inflammation of the shoulder joint with fever, which heals quickly and an inflammation of the sterno-cleido-clavicular joint. Ten days K. J. without result. During this last joint inflammation one eye becomes red with symptoms of iritis and about fourteen days later a white small tumor is seen in the upper part of the iris.

Called in, K. found the right eye normal, the left with iridocyclitis: Descemet-spots, narrow bound down pupil with exudate in the pupillary space; slight pericorneal injection and some sensitiveness on pressure. T=N. In the middle of the upper part of the iris is a small white irregular tumor, diameter about 1.5 mm., the bottom of which is formed by a pigment accumulation. No blood vessels visible. About three weeks later patient died, and 24 hours later the eye was removed. One of four possibilities: unpigmented sarcoma, solitar tubercle, gumma and granulation tumor consequent to a foreign body are mentioned. K. will report at a later meeting the microscopical findings. E. E. B.

A TUMOR OF THE HYPOPHYSIS CEREBRI.—SCHEFFELAAR KLOTS, P. (*Tyds. v. Geneesk.*, July 25, 1914), reports the following case from Johannesburg, Transvaal, as up to his only one case of operative cure has been reported in Dutch literature. The 40-year-old woman had been healthy up to two years ago. She began then to suffer with headache, sometimes dizziness and nausea, which increased in severity. Since half a year vision has become more difficult, reading is still possible, but now and then attacks of obscuration. Her periods are still regular but shorter in duration with less hemorrhage. Her weight has decreased since six months due to worry about her condition. The pupils are wide and react slow to light. Lindsay Johnston found the fundi very pale and the vessels very tortuous; bitemporal hemianopsia (which is not distinct for the O. D. according to the field chart, rev.). The Roentgen-photo showed a tumor extending from the sella turcica and chiasma into the third ventricle. Wass. neg. Patient was operated upon in sitting posture. A longitudinal incision was made over the nasal dorsum parallel to the median line from the ossa nasalia, ending in the ala nasalis. The dorsum nasale was prepared from the sep-

tum, and the right nasal half bowed out; also the left. A part of the septum was resected submucous up to sinus sphenoidalis. This was made by forceps and chisel in one cavity, so that the sella turcica was reached easily. This was namely much prominent and the bony covering was thin, so that a few strokes of a hammer on a 12 cm. chisel were sufficient to make a large opening. A part of the tumor presented in the opening; some six grams were removed when a pretty large quantity of cerebro-spinal fluid escaped. The opening then was tamponed with iodoform gauze, which reached the left nasal wing. On the second day the headache had disappeared, vision improved daily, although slow. On the fourteenth day patient left the hospital with enlarged visual fields.

A CASE OF TUBERCULOSIS OF THE HYPOPHYSIS.—HEYBROEK, N. J., (*Tyds. v. Geneesk.*, July 4, 1914), mentions in the meeting of the pediatric society how a 7-year-old girl came under his care for a trouble of the vision, which came on pretty suddenly and appeared to be progressive, after having shown during a year increasing symptoms of diabetes insipidus. Diagnosis: In both eyes neuritis retrobulbaris; no bitemporal hemianopsia, no choked disc. Urine, daily quantity about 4 liters, with S. G. 1001—1004, no sugar even with abundant carbohydrate feeding. Von Pirquet neg., but after one week undoubtedly pos. A month later a strong sleepiness, with much yawning and decrease of the urine quantity with increase of the S. G. The vision diminishes so that four or five months after the beginning complete blindness is present. Then the patient must be awakened for his meals; chewing is very imperfect; the mouth remains often opened during this time. The memory does not seem to have suffered during the few clear moments. The pulse frequency rose from 84 to 104, while the blood pressure sunk from 106 to 80 mm. Hg. During this drowsiness an adipose layer formed around the trunk. Five months after the beginning of the visual disturbance, about 1.5 years after the beginning of the diabetes insipidus, the child succumbed with the picture of tuberculous meningitis (with typical slowing of the pulse). A Roentgen-photo showed a shadow in the cavity of the not enlarged sella turcica, which had to be ascribed to the proc. clinoidens anterior. As operative interference was excluded radium, later tuberculin, was tried. As reaction after the third tuberculin injection vomiting appeared with temp. 40° and great prostration, and the following day a nearly critical decrease of the temperature with an unbelievable amelioration in the general condition: no sleepiness. Patient eats and drinks with gusto. Afterwards again it grew worse. Sp. thinks re-

garding the position of the gland with respect to the nn. optici and chiasma that an inflammation originating in the gland can very well produce a neuritis retrobulbaris without bitemporal hemianopsia.

METASTATIC ENDOTHELIAL SARCOMA OF THE RECTUS INFERIOR MUSCLE.—BIETTI, A., Siena (*Klin. Mon. f. Aug.*, 54, p. 462), gives a review of literature on the few cases of metastatic carcinoma and sarcoma of the exterior ocular muscles, and reports a case of his own. A man, aged 65, had exophthalmus, more of the left eye than right, the movements of the left eye downwards and also inwards and upwards were limited. The autopsy revealed a retroperitoneal endothelial sarcoma, whose primary seat probably was in the right suprarenal capsule or the numerous retroperitoneal lymphatics or lymph ganglia, although they showed more secondary signs, numerous metastases in the ribs, lungs, thyroid, brain, the knee of the facial nerve, and a nodule of the size of a hazel nut in the left rectus inferior. A section showed its fibrous consistency with some hemorrhagic stripes. C. Z.

ON INTRAOCULAR TUMOR AND RADIOTHERAPY.—DEUTSCHMANN, R. (*Zeit. f. Aug.*, 33, p. 206), treated a melanosarcoma of the chorioid of the left eye of a man, aged 51, whose right eye had been enucleated 37 years ago on account of an injury, with mesothorium, 0.01. This, included in a capsule, was for from 1 to 2 hours sewed into a pocket of the conjunctiva at the place of the tumor. After 9 days the tumor was decidedly flattened. The treatment was repeated after a month. 3 months later the status was the same. The patient received now 4 treatments at intervals of about 2 weeks with the result that the former globular projection of the tumor was replaced by a system of folds with red interstices. Its margins were indistinct, but marked by pigment masses. A subretinal effusion was 3 times drawn by puncture. As the patient wished to return to his home in South America, the treatment was discontinued. V fingers at 3 m., visual field more contracted. There was no doubt that the tumor was influenced by the rays, but D. raises the question, whether by the disintegration of the tumor material an occasion for conveying it into the body may be created and thus metastases promoted. C. Z.

ON DIFFERENT FORMS OF CARCINOMA OF THE LIDS.—PÁLICH-SZÁNTÓ, OLGA (From the eye clinic of Prof. E. von Grósz in the University of Budapest. *Arch. f. Aug.*, 59, p. 18), gives a review

on the different forms of carcinoma of the lids, their origin from the epidermis or its glands and frequency, with reference to the large essay of Mayeda in 1903, and the views with regard to their genesis, and reports the clinical histories of 12 cases. These were all basal cell carcinomas, from which P. concludes that carcinomas of the lids are predominantly basal cell carcinomas, in which the deepest layer of the epidermis commences to proliferate, distinguished from carcinoma spinocellulare which arises from the spinous cells of the epidermis, according to the classification by Krompecher, based on the histogenetic principle. C. Z.

VISION AND COLOR VISION

HEREDITARY DEFICIENCY OF THE LIGHT SENSE IN OTHERWISE HEALTHY EYES, WITH REPORT OF A CASE.—LANGDON, H. M., Philadelphia (*Ann. Ophthalm.*, July, 1915). The family consisted of the parents, two daughters and a son. The afflicted members were the father and one daughter. They were both astigmatic, but with correction vision was normal under good illumination. When the illumination was reduced vision and visual fields were reduced. The fundus appearances were normal. With Henry's photometer the daughter had a light sense with right eye of $3/5$ and $2/5$ with left. The father had a light sense reduction in each eye of $1/4$. He compiles a very interesting bibliography of the literature on this condition. M. B.

ON RED-GREEN BLINDNESS AFTER GLARING BY SNOW.—LOHMANN, W. (From the eye clinic of Prof. C. von Hess in the University of München. *Archiv. f. Aug.*, 79, p. 35), reports, supplementing his former essay in *Arch. f. Aug.*, 75, 2 further cases of red-green blindness after glaring by snow. In the first case the color disturbance was transient. In the second case a congenital alteration of the color sense showed a further transient deviation by the glaring through snow, which under constant observation decreased to a stationary condition, as it is found in congenital extreme green anomaly. C. Z.

DARK ADAPTATION OF THE EYE IN PARALYSIS OF THE SYMPATHETIC NERVE.—STARGARDT, Kiel. (*Zeit. f. Aug.*, 33, p. 149). A soldier, aged 25, was injured before Antwerp by an infantry rifle. The bullet entered the neck in front of the left inframaxillary angle, severed the sympathetic nerve either in or below the lowest portion of the ganglion cervicale superius and remained in the

bodies of the 3rd, 4th and 5th cervical vertebrae, with resulting total paralysis of the left sympathetic nerve. S. tested the dark adaptation of the eyes with Nagel's adaptometer and found the sensitiveness of the left eye decidedly reduced. He explains this not by a disturbance of the dark adaptation, but by the miosis of the left eye due to the paralysis of the sympathetic nerve. After remaining 45 minutes in an absolutely dark room photographs with flashlight showed the widths of the right pupil 1.3 mm., of the left 5.6 mm. and their respective areas 41.8 square mm. and 24.7 square mm. This difference is so great that it easily explains the difference of the values of sensitiveness of both eyes.

Another point speaks against the influence of the sympathetic nerve on dark adaptation. If this would be the case it would have to be much more effectual, as a comparison with the perspiration shows. In an electric light bath the right side of the face was red after 15 minutes and the perspiration ran in streams from the forehead and the cheek, while the left paralyzed side remained pale. Likewise the sympathetic nerve has, according to the experiments of Ayres and Kühne, no influence on the regeneration of the visual purple.

S. also mentions his experiments on rabbits, made in 1910, in which he showed that after cutting one optic nerve, the regeneration of the visual purple in this eye commences and reaches its maximum simultaneously with that of the other normal eye.

These facts demonstrate that regeneration of the visual purple and dark adaptation take place automatically in the eye itself and independently of any nerves or nerve centers. C. Z.

HEREDITY OF COLOR BLINDNESS.—WAARDENBURG, P. J. (*Tyds. v. Geneesk.*, May 16, 1914), asks the physicians of his country, who take interest in this subject to provide him with material. One does not need to be specialized to be able to do a part of this examination. Especially the exceptions should be followed and their pedigree made. For dubious cases of color blindness the 13th and 14th edition of Stilling's pseudo-iso chromatic tables are recommended.

For the second part of the questions only specially trained physicians can be of help. They have to find out how and if the different forms of color blindness and weakness are found in one family, with the possible pedigree.

We know, that the colorblindness is transmitted from man through healthy daughters to grandsons. The same rule is followed by Haemophilia, pseudo-muscular hypertrophy, megalocornea,

some forms of night blindness, and nystagmus. The explanation from eugenic standpoint has proven to be very complicated. In the first place it is a phenomenon, where the gender plays the chief role. At the present time rather the exceptional cases are of great interest. F. i. we find 0.25% color blind women against 3% men. It becomes more apparent that a woman shows only than color blindness, when she has inherited this affection bilaterally, viz. when color blindness appeared among both ancestors. Also one sees from time to time among direct descendants this affection. We also have to find out if healthy sons can propagate the attribute. Also has been observed that sick daughters can transfer directly the condition on their children. Also must be found out if the condition can escape more than one generation without being introduced from both sides. And more especially one could expect to find an answer to the question, how and if the different forms of color blindness are connected.

E. E. B.

THE CLEARNESS OF LUMINOUS PERCEPTION DURING MONO- AND BINOCULAR VISION.—ZEEMAN, W. P. C., AND ROELEFS, C. OTTO (*Tyds. v. Geneesk.*, February 21, 1911), took up the question treated by Fechner, Helmholtz and Hering and to which Piper in 1903 called again attention. He seemed to have proved, that during light adaptation none, during dark adaptation indeed summation of the incitations from both eyes does happen. One adapted to daylight sees an object as clearly with one as with both eyes, while during dark adaptation an object seems double as clear with binocular as with monocular sight. These observations were at the same time a welcome support for the "Duplicitaetstheorie."

They had made a box, which makes it possible to compare a field seen with two eyes with one seen by one eye. A first set of experiments seemed to prove that even after 5 minutes a summation of the excitations of both eyes produces a greater binocular clearness during dark adaptation. However the clearness of an object does not depend only on the illumination, but in a higher degree on the adaptation of the observer, on simultaneous contrast and some less important factors. The adaptation of the observing eye changes with every observation and is perhaps different for each eye. They therefore investigated the influence of slight differences of adaptation between both eyes. They found that longer and stronger the preceding monocular adaptation was the more apparent summation. The reverse of a summation can also be produced: When one eye fixes one field for a few minutes and then one sees binocularly, then the binocular field gave an impression of 0.75 times, thus less strong-

ly illuminated than the monocular field. It appears, that during Piper's experiment during the regular to and fro seeing, the one eye, which observes both fields, will adapt itself continuously to light, while the other eye during half of the time looks at the partition, therefore becomes dark adapted. A difference in the condition of adaptation of both eyes will result.

During experimentation it was found that Z.'s right eye was more sensitive than the left one, which may be the result of a quicker course of the dark adaptation of the right eye. No binocular summation could be found by O. R. whose eyes showed an equal velocity of dark adaptation. To make sure that this absence of summation was not due to insufficient dark adaptation the experiments were repeated after 60 minutes dark adaptation. They conclude that there is no question of binocular summation after long dark adaptation and that Piper's experiment has produced wrong consequences by insufficiently accounting for the changes of adaptation during observation.

They experimented now after looking for 15 minutes to the northern sky and found an apparent binocular summation, which showed the most distinctly with greater luminosities. Piper did not find summation with light adaptation. They suppose that it is the result of using small luminosities.

They determined every 3 minutes the threshold value during a stay of 90 minutes in the dark; subsequently separately for O. D. and O. S. and both eyes together; to make sure that the starting point was equal they fixated before hand a surface of known illumination during 45 minutes. They found that as well for light—as dark adaptation the binocular threshold value is considerably lower than the monocular; that there is no question of a characteristic antithesis in this regard between light and dark adaptation, as Piper thought to have stated. There is no question of binocular summation by seeing at surfaces of more or less luminosity, neither by light nor by dark adaptation. The threshold value to the contrary is always lower, examined during light and dark adaptation. These experiments can therefore not support the "duplicitaets-theorie."

The difference between the monocular and binocular threshold values can perhaps be explained as follows: No sharp outlines are observed in determining threshold values; this absence makes, that with monocular determination, the one eye cannot receive a larger part of the perception; when with binocular determination one eye is closed, this removal of contrast of this eye will weaken the existing

minimal luminous perception, the contrast, which is offered to the other eye for observation, must become now much stronger if it will produce a light sensation in spite of the weakening influence of the absence of contrast in the closed eye. This may explain why the monocular threshold value will be greater than the binocular.

E. E. B.

VISUAL FIELD

DISTORTIONS OF THE VISUAL FIELDS IN CASES OF BRAIN TUMOR: CHIASMAL LESIONS, WITH ESPECIAL REFERENCE TO BITEMPORAL HEMIANOPSIA.—CUSHING, HARVEY, AND WALKER, CLIFFORD B., Boston (*Brain*, March, 1915). In this most admirable paper the authors report a series of 81 cases divided into four groups: (1) Those with a bitemporal defect of vision; (2) those with a homonymous defect; (3) those already blind in one or both eyes, under which circumstances it is often difficult and sometimes impossible to tell in which group—bitemporal or homonymous—the case actually belongs; and (4) the cases with irregular defects, which are scarcely to be classified. The periods in the advancing process are termed "stages." Of these there are eight, and they are enumerated serially from the normal field to the stage of blindness. Cases are cited to illustrate different stages in the process, with interesting comments. Dr. Walker gives in detail the technique of perimetric examinations with case reports. The recapitulation follows: "In a series of 154 cases classified as tumor of the brain there have been 101 in which the lesion was of hypophysial or parahypophysial origin, and in 81 of these cases chiasmal involvement led to deformations of the fields of vision. These deformations tended at the time of admission to be bitemporal in 26 cases, homonymous in 12, were unclassifiable in 8 cases, and the remaining 35 showed blindness in one or both eyes, making it difficult to tell in which group—bitemporal or homonymous—they belonged. In cases of bitemporal hemianopsia it is unusual for the field defects to be bilaterally symmetrical, the text book representation of the condition, with a vertical meridian dividing blind from seeing retina in each eye, being relatively uncommon. In the majority of cases, whether of intra or suprasellar tumor, the first perimetric indication of the process is shown by a slant in the boundary of an upper temporal form field and a corresponding quadrantal defect in the color peripheries. For clinical convenience this is designated as Stage I of the process, and with a progressive lesion the field defects advance in characteristic fashion through Stage IV of actual hemianopsia to Stage VIII

when blindness has ensued. In all stages the loss of color perception is usually in advance of that for form, and the condition in one eye is usually in advance of that in the other, so that every possible stage combination in the two eyes may be met with. When relief from pressure has been afforded by operative measures the recession of the defects takes place in a sequence, the reverse of that characterizing the stages of an advancing process. In the receding process relative paracentral scotomata often persist, as the functional vulnerability of the macular and paramacular fibers appear to be greater than that of the other fasciculi. Restoration of normal field peripheries is possible even when the process has advanced to or beyond the Stage IV of typical half vision, and some vision may be regained even after blindness has occurred, provided it has not been of too long duration. In view of the prompt restorations in field outlines which may follow operative relief from pressure, it is evident that the so-called primary optic atrophy often does not represent an actual anatomical degeneration so much as a physiological block to the transmission of visual impulses.

In Conclusion.—Detailed perimetry with small test objects of serial sizes, particular attention being paid to the shading off of the upper temporal peripheries and to the presence of relative paracentral scotomata in the same quadrant, is advocated for patients with pituitary disease in order that stages of hemianopsia antecedent to those usually recognized may be detected.” J. M. W.

RING SCOTOMA IN SYPHILIS OF THE EYE.—MARX (*Tyds. v. Geneesk.*, February 21, 1914), points at our small knowledge about ring scotomata. In some cases we have visible changes in the fundus, in others none during the whole course of the disease. Our knowledge is here nearly entirely hypothetical. Marx does not believe it superfluous to report new cases, which may give another insight in the origin of ring scotomata, even if it is necessary to combine the facts by a hypothesis. The morbid history is as follows: Patient comes in November, 1911, with complaint of bad vision and flickerings, no hemeralopic complaints. Condition exists since a few weeks. A year before he had contracted syphilis, which was insufficiently treated. V. O. S. 2/10, with +1.5 sph.=5/10. V. O. D. =0, 5/50, no impr. w. gl. No changes visible in corp. vitr., ret. chor. nor opt. n. The fields were generally narrowed, in O. D. also a central scotoma for white and colors. As patient was recently married inunctions could not be made, so protojod hydr. was given. Nose and nasal cavities were normal. V. improved and was on January 12, 1912, O. S. =3/10, with +1.5 sph.

$\equiv 5/10$; O. D. $\equiv 5/10$ with $+1.5$ sph. $\equiv 6/10$. When patient could not tolerate any more Hg. he received K. J., and in May V. in O.O. was after corr. $\equiv 6/10$. The fields were only little restricted for white and colors. Patient stayed away until February, 1913, when he returned with V. O. S. $\equiv 1/50$, V. O. D. $\equiv 2/50$, no i. w. gl. The field taken with a white quadrant of 10 mm. showed ring-like gaps in the field located concentrically around the center, but were not closed; colors were not at all perceived. The condition improved so much under antiluetic treatment that the field could be taken with 2 and 5 mm. objects for white, red and blue. Green was not recognized centrally and peripherically neither now nor later. The fields showed concentric narrowing, with ring-like scotomata for white, in the left a nearly closed ring, in the right about a half ring, in both in contact with the blind spot. Ring scotomata could not be found for colors, but their fields were concentrically constricted with peculiar central scotomata for red and blue, which were not found for white. As the condition remained stationary patient subjected to innunctions. Five months later V. O. S. $\equiv 3/10$, O. D. $\equiv 5/10$. The fields had become larger for white, the ring scotomata for white had retrogressed and were now some dispersed ring-like pieces, while the fields for red and blue had become larger and the central scotomata for these colors had disappeared. Again three months later V. w. corr. $\equiv 5/10$, but restes of the ring scotoma were still present, although in another locality as in previous examination. Patient stayed away; returned in March, 1914, for the third time. V. O. D. $\equiv 2/50$, V. O. S. $\equiv 5/10$. Colors were not recognized. A central scotoma with a ring scotoma was present in O. D. Innunctions. 14 days later the central scotoma had disappeared, while the ring scotoma, which had become broader began to show some light spots. At the last examination in May the V. O. S. $\equiv 1/10$; V. O. D. $\equiv 4/10$. In O. D. still an imperfect ring scotoma.

During the 2.5 years observation not the slightest internal change of the eye. After going over the different theories of ring scotoma Marx wishes to explain the condition as follows: A syphilitic inflammation of the optic nerve has taken place, which was very severe, as with every relapse the vision in one or both eyes diminished to some few 50th. The entire nerve must be thought to have become inconductable for visual impressions through inflammatory products. Though syph. produces mostly a peripheric inflammation of the O. N., we know of cases of retrobulbar neuritis. The papulo-macular bundle has not a specific affinity

to syph. and will recuperate the quickest. The ring scotoma is a sequence to the fact that syph. is before anything else a disease of the blood vessels. The vessels nourishing the O. N. enter from the periphery with the primary and secondary septa, which vessels form large anastomoses, so that irregular concentric vascular rings are formed in the nerve. Some until now unknown cause may make, that the inflammation in the vessels, which form a ring, lasts longer than in the other parts, so that the nerve fibers, which depend for their nourishment on these vessels, are insufficiently provided, with the result that in that region, which will have a ring form, however irregular, light stimuli are not transferred.

Marx explains why a functional cause can be excluded. The place of the disease is probably between the chiasm and the entrance of the vessels in the nerve. E. E. B.

ON INCONGRUENCE AND ASYMMETRY IN THE HOMONYMOUS HEMIANOPIC FIELD.—RÖNNE, H., Copenhagen (*Klin. Mon. f. Aug.*, 54, p. 399), emphasized before, that the borders of a pathological visual field are not as well defined as the normal, because frequently a relative defect of different width forms the boundary of the absolute defect. Slight differences of illumination and attention may in otherwise correct technic of examination create considerable accidental variations of the limits. Therefore absolute defects in complete hemianopic halves are no proof of an actual incongruence of the visual fields, and the employment of several objects of different quality is necessary to determine to some degree the border of the defect. R. attributes to a marked incongruence in a hemianopic field a certain diagnostic significance for an affection of the tract near the angle of the chiasm, although also congruent defects occur in definite tract hemianopsia. R. agree with Lenz that the visual acuity in tract hemianopsias frequently is diminished and different in both eyes, which corresponds with the incongruence of the periphery of the visual field.

The clinical histories of 8 cases are given with remarks, from which and other observations it seems to transpire, that irregularities of the intermixture in the fascicular area may be found. There are also other relations which show that binocular vision may be attained without common fascicular field of the corresponding retinal elements, e. g. the paradoxical diplopia after squint operations. On the other hand the ascertained irregularities seem to be of very small extent and all to occur at the border line between both halves of the visual fields. In the majority of cases the intermixture of fascicles is very regular. C. Z.

Book Reviews

Swanzy's Handbook of the Diseases of the Eye and Their Treatment.—Eleventh edition, with illustrations. 646 pages. Philadelphia, P. Blakiston's Son & Co., 1915.

This is the first edition which has appeared since the death of the late Sir Henry Swanzy, and the editor has carefully avoided making any change in the general plan or character of the book, which was originally intended for the general practitioner and student.

The text has again been completely revised and brought up to date, with the result that a considerable amount of new matter has been incorporated, but without any notable increase in the number of pages.

The chapter on the Pupil, which was omitted in the last edition, has now been restored to its place. In the chapter on Glaucoma, the trephine operation has been dealt with in greater detail, and a description of Schiötz's tonometer has been added. The Diseases of the Retina have been to some extent rearranged: Hemorrhagic Retinitis is no longer treated as a separate entity, but is referred to under Thrombosis of the Retinal Vein, while a separate paragraph is allotted to Retinal Hemorrhages in general; Angio-sclerosis and obstruction of the Retinal Circulation receive more attention than heretofore, and Capillary Angiomatosis of the Retina and Massive Exudation are briefly described.

The chapter on Nystagmus has been altered and amplified, and now includes a brief account of Vestibular Nystagmus. The chapters are differently arranged, with the result that the earlier ones now treat of the normal eye and its functions, and the methods for examining them.

In what appears to be a thorough revision of the book, obsolete matter has been discarded, while new developments have been introduced. The book now, for the first time, contains colored figures, to the number of twenty-one, from original paintings, which will prove helpful to the student.

A. G. GREENSTREET.

Lacrimal Diseases and Their Treatment.—Würdemann, H. V., Seattle. (Contributed to the Reference Handbook of Medical Sciences, Vol. V.) Wm. Wood & Co.

The author's treatment of the lacrimal question is praiseworthy, in that he has succeeded in winnowing the essential from the non-

essential, thereby condensing within a few pages what would otherwise have required many.

One is struck with the profusion of illustration employed, lacking only to be set in motion to produce a veritable moving picture of this very entertaining little lacrimal tragedy.

Many of these excellent illustrations are copies of original drawings by the author from his own cases.

While the usually accepted methods of treatment of the lacrimal apparatus are described and recommended, Würdemann says, with reference to the extirpation of the sac: "It is a very satisfactory procedure and cures the disease permanently, which all or any of the others may not accomplish." A. G. GREEN-STREET.

Ophthalmoscopic Diagnosis for General Practitioners and Students.—Edited by Jean, George W., New York. Sixty-eight illustrations. E. B. Meyrowitz, Inc., London, New York, Paris.

This is a handy little book of probable value to students. The description of the plates, some 68 in all, which are printed in the text, is boiled down to the limit.

The cuts have evidently been reproduced from colored drawings and it is a pity that they were not reproduced in color, as the black and white illustrations are of little value for the student in studying ophthalmoscopic diagnosis. H. V. WÜRDEMANN.

Operations of the Eye and Its Appendages.—Wheeler, John M., New York. Johnson's Operative Therepeusis, Vol. 3, 1915.

This essay of 90 pages has 113 illustrations, all of them essential, many of them new and all of them of distinct value. The text is clear and shows a knowledge of the subject as seen by the teacher, and therefore of special value to the student.

It has been sent to the reviewer in the form of a separate reprint, well bound and typed.

It is gratifying to see that in practically all American works of this nature the editorial staff of *Ophthalmology* has contributed valuable material, and we congratulate the author on his entrance into this kind of work. H. V. WÜRDEMANN.

The Ophthalmic Year Book.—Volume XI, edited by Jackson, Edward Professor of Ophthalmology in the University of Colorado, assisted by a large staff of collaborators. Illustrated. Denver, Colo., Herrick Book & Stationery Company, 1915.

We make the annual welcome to the Ophthalmic Year Book. It

is somewhat enlarged and carries perhaps a larger amount of American and English abstracts than heretofore.

As noted in the preface, we can not get away, even in ophthalmology, from the contentions of the crowned heads of Europe. The war has cut out, as was to be expected, much of German and Austrian literature, not only from lessening of the output, but likewise loss of authors, some of them dear friends, who unfortunately for themselves, have lived in the wrong countries.

This year's digest gives the names of the editors in charge, truly a representative list of American and English authorities.

The work is commended for the library of ophthalmologists.

H. V. WÜRDEMANX.

American Encyclopedia of Ophthalmology.—Volume VII, edited by **Wood, Casey A.**, of Chicago, assisted by a large staff of collaborators. Fully illustrated. Chicago, Cleveland Press, 1915.

The most exhaustive articles in this volume are "The History of Eyeglasses and Spectacles," which is given by Emery Hill of Chicago, "The Adjustment of Eyeglasses and Spectacles" by B. A. Weeks, "The Eyes of Soldiers, Sailors, Etc." by Nelson Miles Black, "General Diseases in Ophthalmology" by Casey A. Wood and pages 5493-5510 by William Campbell Posey.

This work is proceeding most satisfactorily and is of great value.

H. V. WÜRDEMANX.

The Medical Annual Synoptical Index for the Ten Years 1905 to 1914.—Published by John Wright & Sons, Ltd., Simpkin, Marshall, Hamilton, Kent & Co., Ltd. New York: William Wood & Co., and at Bombay Thacker & Co. Melbourne, Sydney, Adelaide and Brisbane G. Robertson & Co., Proprietary, Ltd.

This book forms an index to the well-known *Medical Annual* and fills over three hundred pages, which proves its completeness. It will appeal to all past subscribers, in fact is indispensable even to non-subscribers, as its possession will afford a means of reference which is simply invaluable.

A. A. BRADBURN.

An Index of Treatment by Various Writers.—Edited by **Hutchison, Robert, M. D., F. R. C. P.**, Physician to the London Hospital and Physician (with charge of out-patients) to the Hospital for Sick Children, Great Ormond Street; and **Sherren, James, F. R. O. S.**, Surgeon to the Poplar Hospital for Accidents. Seventh edition, revised and enlarged. Published by John Wright & Sons, Ltd., Bristol. New York, William Wood & Co.

The first edition of this work appeared in 1907 and fresh edi-

tions have appeared yearly, except during 1909 and 1912. This alone proves its value and popularity. It is naturally better known amongst general practitioners than amongst members of the ophthalmic profession, but for all that it should find a niche on the latter's shelves. The treatment of affections of the eye has in the great majority of cases a general side as well as a local one, and however much the latter is the sphere of the general practitioner we should be acquainted with it even when not actually called upon to employ it. It is in this work that we find such information, and there are few treatises even in ophthalmic literature which deal better with this aspect. If for instance we turn to the subject of "Iritis," we find over two pages devoted to consideration of the "General Treatment," most of which is from the pen of the late Dr. Hancock, but revised by Dr. W. T. Lister, who has done the majority of the contributions associated with eye diseases. As the work is intended mainly for the general practitioner, ophthalmic operations are wisely omitted and also the subject of refractive errors, though a little more space might have been afforded with advantage to the subject of educative myopia. We note the omission of any reference to scleritis, and also fancy that "optic neuritis" deserves a paragraph. The work will be found one to refer to with great advantage on numerous occasions.

A. A. BRADBURN.

Elements of Optics.—For the use of schools and colleges. **Parker, George W.**, of Trinity College, Dublin. Published by Longmans, Green & Co., London, New York and Bombay. Price 2s 6d.

We should feel inclined to add to the above title after "colleges" the words "and those who have not mastered the elements when at the aforesaid seminaries." Many men who take up ophthalmic work have doubtless found their neglect of the subject of optics at college affect them in the mastery of the problems associated with refractive work. They are forced then to turn to the larger works, such as the one by Percival, only to find the difficulties increased, especially by those not given a mathematical mind. The work consists of about a hundred small pages divided into four chapters: Reflection of Light: Refraction of Light: The Eye and Optical Instruments: Dispersion of Light.

It is designated as a strictly elementary work by the author, but for all that fulfills its purpose as a preliminary to the larger text books, and as such we can cordially recommend it.

A. A. BRADBURN.

An Index of Prognosis and End-Results of Treatment.—By various writers. Edited by **Short, A. Rendle, M. D., B. S., B. Sc. (Lond.), F. R. C. S. (Eng.)**; Hunterian Professor, Royal College of Surgeons; Examiner in Physiology for the F. R. O. S.; Hon. Assistant Surgeon, Bristol Royal Infirmary; Lecturer on Physiology, University of Bristol; Captain R. A. M. C. Published by John Wright & Sons, Ltd., Bristol. Simpkin, Marshall, Hamilton, Kent & Co., Ltd., London. The Macmillan Company of Canada, Ltd., Toronto.

This volume is a companion to the other two well-known and deservedly popular works, *Index of Treatment* and *Index of Differential Diagnosis*, published by the same house.

The two objects which the work endeavors to attain are (1) to give unbiased opinions as to the outcome of various methods of treatment, (2) the probable result apart altogether of treatment.

It must be admitted that with such objects in view the authors have set before themselves a high standard for attainment. They seek, in fact, to furnish what can only be obtained under other circumstances after many years of extensive practice, and then the knowledge gained would be very strictly limited to each individual's particular sphere. To furnish knowledge of the probable result of any disease and the various effects of different methods of combating it, is the aim of all text books on medicine, but that of this work is to base conclusions on sound statistics. The sources of such statistics have to be very carefully verified; we all know how prone our profession is to publish our successes whilst omitting our failures. For these reasons the editor has taken a great deal of pains to search through the results as shown by the records of cases in the Bristol Royal Infirmary, and in addition to searching the records of general medical literature has communicated with upwards of a thousand past patients. Naturally such must have been a laborious undertaking, to the result of which the pages of the volume conclusively prove. We note the omission of all reference in a direct sense of diseases dealing with the eye. We suppose this is due to the reason that the work is written for the general practitioner and that ophthalmic surgeons know the outcome of such diseases and the end of the treatment so well that such a branch would be superfluous. Or it may arise from the fact that this being the first edition of a totally new idea in medical publications it was not deemed advisable to incorporate it. For all that, one cannot help thinking that the general practitioner would like to know the prognosis say of iritis, glaucoma, corneal ulcer, etc., just as we ophthalmologists will look up this work to see the prognosis of such affections as albuminuria, arterial sclerosis, cere-

bral tumor, myasthenia gravis, gout, rheumatoid, arthritis, etc., and other diseases with which we are linked in our profession with our brother practitioners. Finally as a personal factor in our own cases, when assailed by illnesses it will be found to possess a special appeal of its own.

A. A. BRADBURN

On the Eye Symptoms in Diseases of the Nervous System.—Uthoff, W., Breslau. Graefe-Saemisch-Hess, Handbuch der gesamten Augenheilkunde, second, entirely new edition. Nos. 255 to 258, page 1489 to page 1677. Leipzig, Wilhelm Engelmann, 1915. 8 M., \$2.

These numbers conclude Uthoff's great work on the eye symptoms in diseases of the nervous system, in which he utilized his personal experience, to a great measure gained in many years on the immense material of the Charité and other large hospitals and insane asylums at Berlin, Marburg and Breslau, in conjunction with numerous well-known neurologists and psychiatrists: Hence the great authoritative value of the book.

In the excellent chapter on the ocular symptoms in progressive paralysis, U. says that literature contains a great many exaggerated and erroneous statements of ophthalmoscopic changes, betraying lack of ophthalmoscopic schooling or prejudice, and gives statistics from his own material. According to this the frequency of progressive atrophy of the optic nerve is 8% and approximately corresponds with that in tabes, which U. found from 8% to 10%. The most important diagnostic and prognostic phenomena are the pathologic changes of the pupils. U. found reflex iridoplegia in 44%, tardy reaction to light 16%, difference of size 22%, miosis 21%, marked deficiency of roundness 25%, ocular palsies in 10%. Of great interest are the differential diagnostic remarks, setting forth the great value of ocular symptoms in progressive paralysis in comparison to some other diseases of the nervous system.

The next chapters deal with the eye symptoms in idiocy and imbecility, dementia praecox, dementia senilis, epilepsy and functional psychoses. Thirty-nine pages are devoted to the eye symptoms in hysteria, which U. believes are called upon to give important diagnostic clues. He belongs to those who attribute to the marked concentric contraction of the visual field considerable significance in hysteria. Finally hallucinations and illusions from diseases of the visual organ are discussed. After each chapter a complete bibliography is given.

C. ZIMMERMANN.

Neurology of the Eye, a handbook for neurologists and ophthalmologists, Vol. VI. **The Diseases of the Chiasm.**—Wilbrand and Saenger, Hamburg. 292 pages, with numerous illustrations in the text and 16 plates. Wiesbaden, J. F. Bergmann, 1915. 17 M., \$4.25.

After a general survey over the diseases of the chiasm, the visual disturbances caused by them are discussed: bilateral amaurosis, sudden bitemporal hemianopsia, the finer diagnostics with reference to the course of fibers, excellently portrayed on anatomical plates, and nature of the visual disturbances and their production by diseases of the chiasm, mostly due to interruption of conduction by pressure, respectively atrophy of the visual path from nutritive disorders, or separation of continuity by traumatism. Under the alterations of the visual field the typical bitemporal hemianopsia and its numerous modifications occupy the greatest space. Then the course of the visual disturbances, rapid or slow, the striking changes in their intensity and the form of the defects of the visual field, the behavior of central vision and pupils, ophthalmoscopic conditions, accompanying phenomena, as headache, implications of ocular and other cranial nerves, etc., are considered. In the section on etiology the tumors receive a very exhaustive presentation, including the concomitant affections of the tumors of the hypophysis, as akromegaly, glycosuria, hypophysial dystrophy, etc., in the second place syphilis, especially the basilar gummatous meningitis, then tuberculosis, internal hydrocephalus, multiple sclerosis, injuries and congenital defect of the chiasm. The final chapter is devoted to the operations on the hypophysis, considering the indication and the operative results up to 1913.

A bibliography of 742 numbers shows the immense amount of literature which has been utilized also in this volume of the magnificent encyclopedic work, in every respect, abundance of material, symptomatology, pathologic anatomy, and clinical histories, equal to its admirable predecessors. The unusual number of excellent plates greatly adds to the understanding of the complicated symptoms of a great number of affections of the chiasm. A table of contents and index of authors and subjects facilitate orientation.

C. ZIMMERMANN.

Guide to Expert Testimony on Injuries of the Eye.—Zur Nedden, M., Professor, Düsseldorf. 52 pages, with two figures in the text. Second edition. Wiesbaden, J. F. Bergmann.

The first edition, which was reviewed in *Ophthalmology*, Vol. VIII, No. 2, p. 298, met with general approval and gave rise to

discussions and clearing of discrepant views. The author utilized these in the second edition by changing and enlarging some of its sections. Thus the methods of testing stereoscopic vision and of detecting simulation are given. Detachment of the retina, malignant tumors, lues, especially parenchymatous keratitis, as consequences of accidents, are discussed, in addition to the topics mentioned in our former review. The useful work will also in its new form be found to be of great practical value. C. ZIMMERMANN.

Examination of Color Sense for Railway and Marine Service.—Rosmanit, J., Wien. 59 pages, with two figures in the text and a plate. Wien and Leipzig, Wilhelm Braumüller, 1907. 1 M., \$0.25.

After a very lucid exposition of the different types of anomalies of the color sense, based on the investigations of von Kries, Nagel and Collin, R. discusses the various methods of testing them. He considers the examination with Stilling's pseudo-isochromatic plates and Holmgren's skeins, prescribed by the Austrian railways and merchant marine, as insufficient, and propounds his reasons for it. In his opinion Nagel's plates are the only useful method for general practice, which allows of the diagnosis of both systems of disturbances of the color sense, the dichromates and the anomalous trichromates, and their especial forms. Detailed descriptions of the plates with direction for their use, of Nagel's apparatus for equalization of colors, and Nagle's anomaloscope for clinics and doubtful cases, are given. Finally R. shows how unsatisfactory are the so-called practical examinations on the road itself. The little book is an excellent guide, which gives in a concise form all that is essential to know for practical purposes and deserves the highest recommendation. C. ZIMMERMANN.

History of Ophthalmology. The Oculists of Italy From 1800 to 1850.—Hirschberg, J., Berlin. Graefe-Saemisch-Hess, *Handbuch der gesamten Augenheilkunde*. Second, entirely new, edition. 197 pages, with 20 figures in the text and a title page. Leipzig, Wilhelm Engelmann, 1914.

It was only recently that we had occasion to announce the appearance of Hirschberg's masterly *History of Ophthalmology* in England in the first half of the nineteenth century, and now he presents the medical world with two new books of equal importance, the history of Italian Ophthalmology from 1800 to 1850 and that of American Ophthalmology in the nineteenth century, a review of which will be found in this volume of *Ophthalmology*. There

was no preliminary publication on the history of Italian Ophthalmology of that period, so that Hirschberg had to create an entirely new work, based on his study of the Italian literature to ophthalmology. The biographies of the Italian promoters of ophthalmology were taken from incident sources, especially the necrologies of the *Annali di Ottalmologia*, and from communications by Prof. G. Albertotti. Also the impressions gained by foreign and Italian surgeons during their travels in Italy were utilized.

The subject is arranged in form of successive histories of the chief schools, beginning with Antonio Scarpa (1752-1832) at Pavia, the founder of the North Italian school, whose portrait we find on the title plate, and ending with the South-Italian school, created by Gian Battista Quadri (1780-1851), from 1815 Professor of Ophthalmology in the University of Naples. Hirschberg says that the unification of Italy led to a fusion of the schools and an individual development which in the second half of the nineteenth century, aside from the cultivation of the clinic, fostered an especially careful study of the normal and pathological anatomy, embryology, physiology and experimental pathology of the visual organ.

C. ZIMMERMANN.

History of Ophthalmology. The Oculists of America in the Nineteenth Century.—Hirschberg, J., Berlin. Graefe-Saemisch-Hess, *Handbuch der gesamten Augenheilkunde*, second, entirely new, edition. 203 pages, with 18 figures in the text. Leipzig, Wilhelm Engelmann, 1915.

This part of Hirschberg's monumental *History of Ophthalmology* will be heartily welcomed in this country, as it is the first history of ophthalmology of the United States of such completeness and resourcefulness. Hirschberg says that in investigating the development of ophthalmology in the United States he encountered two difficulties. The first was due to the complicated conditions of the American higher schools; the second was due to the fact that in the United States ophthalmology developed very slowly during the first half of the nineteenth century, a little more after its middle, but very powerfully after the seventies, so that for gaining a complete survey one has to approach very near to the present day, thus encountering still unsolved questions and their living representatives, over whom the historian has to withhold his judgment and must leave it to his successors.

Hirschberg's sources, indicated in the bibliographies after the single chapters, were: The historical essays of American authors, as H. Friedenwald, A. Hubbell and others, his familiarity with the

American ophthalmological literature for the last 38 years, which were carefully reviewed in his *Centralblatt für praktische Augenheilkunde*, his large library of American text books, monographs, annual reports of eye hospitals, ophthalmological societies, periodicals and encyclopedias, and his personal observations, made during his three journeys through the United States in 1887, 1892 and 1905. Here Hirschberg especially emphasizes that by careful utilization of the American literature he strived to avoid the wrong criticisms of the "rushing travelers."

After a discussion of the American universities and medical colleges, with a complete list of these, the beginning of ophthalmology in the United States is described, with the foundation of eye hospitals, of which the eye infirmary, erected in 1817 at New London by Elisha North, was the first, and its cultivation by the pioneers, starting with George Frick, born 1793 at Baltimore, and their works. Here a special essay on asthenopia and a complete history of asthenopia are inserted, as this subject has in the last third of the nineteenth century been very extensively and exhaustively investigated in this country and forms such a large part of the American literature. Then follow biographies and publications of the first eye specialists born in the United States, as Henry W. Williams and Elkameen Williams, etc., or immigrated from abroad. The most eminent of these was Herman Knapp, who, Hirschberg says, eclipsed all American ophthalmologists of the nineteenth century. His life history with portrait and his great influence in developing the scientific spirit in this country are very well presented, with enumeration of the titles of his more than 130 articles and books.

The new hospitals are described from their annual reports, then the ophthalmological periodicals and ophthalmological societies, text books of ophthalmology, monographs, symposia of the second half of the nineteenth century, and encyclopedias of the commencement of the twentieth century, and the biographies of prominent American oculists of the second half of the nineteenth century, are given in more or less detail, but "de vivis nil."

In conclusion Hirschberg quotes the comments on American ophthalmology by two American authors, H. Friedenwald, 1912, and A. Hubbel, 1908.

Hirschberg's valuable book will not only be read with great interest and delight on account of its useful information and pleasant style, but will also arouse the gratitude of the oculists

of America for having spent such an immense labor in producing an accurate picture of the ophthalmological conditions of their country. As the great handbook of Graefe-Saemisch-Hess is read all over the world, Hirschberg's conscientious work will greatly help to correct erroneous conceptions or entire lack of knowledge about this country, still largely prevalent abroad.

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THE RELATIVE IMPORTANCE OF THE FITTING OF GLASSES IN OPHTHALMIC PRACTICE.

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NEW YORK CITY.

Read before Ophthalmic Section, New York Academy of Medicine,
October 18, 1915.

It has been but a short half century since a few medical practitioners of unusual ability, who were particularly interested in diseases of the eye, felt there was field enough for this special work to justify the practice of ophthalmology exclusively. At first they practiced otology also, but during the past two decades the number of exclusive ophthalmologists has increased rapidly.

The first inventor of spectacles is not known, but their first mention is found in the works of Roger Bacon, and by the middle of the fourteenth century convex lenses, and spectacle frames, were in general use. Bifocal glasses were invented by Benjamin Franklin, and cylindrical lenses for the correction of astigmatism were used early in the nineteenth century.

Arlt seems to have been the first to recognize and urge that the fitting of glasses should be done by the oculist. That glasses could have any other use than the improvement of vision was not appreciated until Donders exhaustively explained the intimate causal relationship between hyperopia and convergent strabismus. Even the immortal Donders did not appreciate the fact that in monolateral squint the amount of astigmatism present, generally determined which should be the squinting eye, or that there was such a function as the fusion faculty.

The eye and its appendages are supplied by one half the cranial nerves, and the act of accommodation and convergence calls into play the function of all these nerves, to a greater or less degree. In view of this well known fact, is it not surprising that the relation of the visual function to general health, and more particularly to general ill health, was not sooner discovered? Even now, it is not

generally appreciated by our profession, and how can we expect the public to understand it when it is ignored by general practitioners, and eminent clinicians write text books, and dismiss the whole subject with a few scanty paragraphs, in which the possible ill effects of faulty visual function on general health are admitted, but in such a perfunctory manner as to convey the impression that the visual function should be investigated, only as a last resort, when all other more probable cause have been eliminated.

Of all the various ignorers of the role of eye strain in the production of functional diseases, and misery, I take off my hat to the neurologist as the worst offender. The extravagant claims of the tenotomists, and some over enthusiastic refractionists, seem to have driven him from polite skepticism to downright and active opposition. In all my years of practice I can recall but few instances in which the neurologist has recommended the investigation of the patient's refractive ocular condition.

I am ashamed to say that the knowledge of the laity as to the importance of visual function on health and general efficiency, has not been acquired from the medical profession, but from the advertising quack optician, who though his sins are many, should be given due credit for preaching to the public the necessity of wearing glasses.

Every person over forty-five years of age has need of glasses at least for near work, and probably not more than twenty-five per cent of the public are properly fitted. While everybody understands that glasses are needed for old sight, it is often difficult to make the patient understand that young adults or even children have need of glasses. To even the average practitioner, hyperopia, myopia and astigmatism are but little understood, and when anisometropia, subnormal accommodation, or muscle imbalance are mentioned he is at once out of his depth. With his meagre knowledge of the physiology of vision, to him, as to the patient, glasses are simply glasses, to be fitted as well by the optician as by the oculist and at much less expense.

As well permit the pharmacist to prescribe for all illnesses. He may be a counter prescriber of long standing and unusual skill, but if the simple belly ache for which he prescribes turns out to be an acute appendicitis, valuable time is lost and grave complications may ensue; but the error is discovered and rectified, while the improper glasses may be worn for months or years, and the ill health treated in manifold other ways since the patient "has glasses." Few doctors and fewer patients realize that the fitting of glasses is the 33rd degree of ophthalmic practice.

In 1906 Dr. George M. Gould read a paper before the American Ophthalmological Society, in which he showed that in thirty years about one per cent of the papers read before that august body, had dealt with the subject of glasses, and their fitting. The paper was not well received, and as Dr. Gould pertinently states the individual who violates tradition or contradicts established authority, does so at his peril. His contention is amply verified by a casual perusal of the lives of such men as Gallileo, Copernicus, Harvey, Jenner, Marion Sims, Lord Lister, and our Lord and Savior, Jesus Christ.

In 1874 Dr. William Thomson of Philadelphia discovered that the accurate correction of ametropia cured headache, insomnia, vertigo, nausea, failure of general health, and various nervous and psychic ailments. These facts he communicated to Dr. S. Weir Mitchell, to whom the credit must be given for having been the first to write at any length on the subject of "Headache from Eye-strain." In his paper he states, "my consultations have plainly enough taught me that hardly any men in the general profession are fully alive to the need of interrogating the eye for answers to some of the hard questions which are put to us by certain head symptoms, since many of the patients treated successfully by the correction of optical defects never so much as suspected that their eyes were imperfect. What I desire therefore to make clear to the profession at large is:

First. That there are many headaches which are due indirectly to disorders of the refractive or accommodative apparatus of the eye.

Second. That in these instances the brain symptom is often the most prominent, and sometimes the sole prominent symptom of the eye troubles, so that while there may be no pain or sense of fatigue in the eye, the strain with which it is used may be interpreted solely by occipital or frontal headache.

Third. That the long continuance of eye troubles may be the unsuspected source of insomnia, vertigo, nausea, and general failure of health.

Fourth. That in many cases the eye trouble becomes suddenly mischievous owing to some failure of the general health or to increased sensitiveness of the brain from moral or mental causes.

I may here remark that books on diseases of the eye scarcely more than allude to the distressing cerebral symptoms of which I have spoken, except when discussing the subject of accommodative asthenopia from hypermetropia. Yet in practice almost all of the extreme refractive or accommodative eye troubles give

rise, in a certain proportion of people, to these symptoms, while in those congenitally sensitive, or who become so in after life, even slight optical defects, especially when unequally developed in the two eyes, may also give rise to like annoyances. I have certainly seen cases in which the form of headache caused by eye troubles was a pure hemicrania, but this I believe to be rare, while I am sure also that in many persons who are already the victims of migraine it has been made worse and more frequent by the use of defective eyes, as, indeed, it may be from any cause of exhaustion, and has again been lessened in severity, and as to the number of attacks, by proper correction of the eye disorder. Dr. Liveing in his interesting and thoughtful work on sick headache (i. e. megrim) states that M. Piorry long ago described megrim as capable of being caused in those with weak eyes by straining at near or minute objects, and this is doubtless the case, but the form of head pain to which I am about to refer is certainly not as a rule of the nature of megrim, and as soon as it disappears, when the eyes are corrected is lacking happily in the obstinacy of that distressing malady."

Dr. Mitchell then proceeds to cite several cases, giving complete histories as to symptoms and results.

While Dr. Mitchell's statements were corroborated by Dyer, Derby, Hay, John Green, Pray, Mills, Savage, William Thomson, W. F. Norris and other oculists, nearly twenty years elapsed before the rank and file of the profession in this country became converts. In England ten years longer were required, and on the continent they have not yet arrived. The latest edition of Fuchs' masterly work still advises giving a plane glass in the poorer eye of anisometropes, although the translator has added a note stating that after some discomfort full correction can generally be worn.

In the medical profession, as in politics and religion, is found the radical, and the conservative, the progressive and the stand-patter. The two types are well shown among general practitioners, in their attitude toward disorders of the visual apparatus. The one fails to appreciate the effect of eye strain on general health, never sending his cases, even of headache, to the oculist, only as a last resort, while the progressive looks on a careful investigation of the refractive condition as a matter of routine. We have all seen many patients who have spent large sums in various forms of treatment, when all that was needed was a pair of proper glasses. Most patients with headache due to eye strain think it due to some other cause, and are quite incredulous when told of its true

origin. This is particularly true of the so-called sick headache, the patients practically always insisting that their headaches are due to their stomach, or refer to them as bilious attacks. It is now generally conceded by most oculists that ninety per cent of sick headache is due to eye strain, and because a patient has had glasses and not been relieved is no sign that eye strain is not the cause of the trouble. Careful and skillful refractionists have so many cured cases that they have grown to take them as a matter of course. The oculist who fails to cure these cases, and considers his more successful colleague an extremist, or hobby rider, would do well to practice introspection. After a careful analysis he will find himself to be a stand-patter. Perhaps he does not find it necessary to correct astigmatism of small amount, or hyperopia of moderate degree. He does not use drops except in small children, and when he does prescribe cylinders the axes 90 degrees and 180 degrees predominate in his prescriptions. Twenty years ago this type of oculist was in the majority, but within the last ten years the ranks of the progressives have been rapidly augmented. To be sure the stand-patter dies hard and still assails us with the question, "why use drops when you do not give full correction after their use?" Or he gratuitously assumes that because a cycloplegic is used full correction is given and that the patient cannot wear the glasses because they are "too strong."

In answer to the first question there can be no doubt of the static refraction of the eye, if the cycloplegic is used, and the giving of one-fourth, one-third, or even one-half the full hyperopic correction by an oculist of reputation and ability can no longer be condoned.

In myopes the tendency to overcorrect the myopia and undercorrect the astigmatism when cycloplegia is not used is axiomatic. A careful post-cycloplegic examination should always be made, and if the examination lacks the discernment to make due allowance for the effect of the cycloplegic, and the adaptability and comfort of the patient, that is no argument against the use of the cycloplegic, or its value in giving its user an accurate knowledge of the patient's static refraction.

The successful business man, zealous for his credit and reputation, pays his note on the exact date it falls due; the insurance adjuster is well paid because of his ability to estimate with exactitude the loss of the assured; the bank clerk hunts for an hour if his balance is off so much as a cent; the bridge engineer knows not in feet but in inches the length of his span; the artist spends

days in mixing his colors to give him the subtle, elusive tint he sees in his mind's eye; the sculptor returns to his work again and again, softening a line here, altering this feature or that, and sometimes utterly destroying that his ideal may be attained.

While medical practice is more an art than a science, we demand that our thermometer shall be accurate; our prescription for digitalis must be correctly compounded; we are not satisfied that our patient has anemia or leucocytosis, but must know the number of both red and white cells and the percentage of certain particular forms; we are no longer content to know that the patient has pneumonia, but carefully study and follow from day to day the progress of the lesion. How many oculists would be satisfied if the optician gave within a quarter or a half a diopter of the correction ordered, or if the cylinders were ten or fifteen degrees from their proper axis? Why should we not ascertain the patient's exact static refraction and correct it as nearly as is consistent with his comfort and happiness? Because some patients can wear ill-fitting glasses with little or no discomfort is not a reasonable argument in favor of inaccurate fitting.

To a colleague working in the same clinic, who was opposed to the use of a cycloplegic, I once offered to have the orderly keep a count for three months, to ascertain which of us had the larger number of patients returning with complaint of unsatisfactory glasses, but he promptly refused, saying that such a procedure would be no fair test.

That the use of a cycloplegic for the estimation of the refraction is becoming increasingly frequent among oculists cannot be gainsaid. But little more than ten years ago in one of the clinics in which I worked, to combat the growing tendency of such use, an order was promulgated forbidding any junior to order any drops for refraction cases, without first securing the consent of the chief surgeon. Needless to say such an order is not now in force and seventy-five to ninety per cent of the refraction work on patients under thirty-five in that clinic is now done under cycloplegia. It seems almost a waste of time to argue in its favor. The therapeutic value of a cycloplegic, by the enforced rest of a tired, irritated ciliary muscle, is often of the greatest value.

We must all be beginners at some time, and to see the helplessness of the novice in his attempts to fit glasses without suspending the accommodation is almost pathetic. The teacher of refraction who advises beginners to fit glasses without the use of

a cycloplegic is in a certain degree responsible for the blunders they are sure to make. Many men have their pet methods and pin their faith on some particular procedure or instrument. Beware of the man who relies entirely on retinoscopy, who follows the ophthalmometer blindly, or who runs all to muscular anomalies, and their correction either by operative or other means. The various instruments of precision, ophthalmometer, tropometer, clinoscope, retinoscope, ophthalmoscope, all aid in arriving at a correct fitting, but the trial case is the court of final resort. With the patient's accommodation suspended, and lenses before his eyes giving him 20/20, 20/15, or even 20/10 vision, the problem of the fitting of proper glasses is but well begun, and the oculist who at this stage prescribes by rule of thumb without a careful post-cycloplegic test will come to grief as often as the one who uses no drops. It is not the province of this paper to enter into the details and difficulties of proper refraction work, but more to impress on our profession the fact that oculists as a class underestimate the importance of accurate and proper fitting.

Sad to relate, the older and more eminent the oculist, the less his interest in refraction work, since it is by many considered the drudgery of ophthalmic practice, and the patient is usually unwilling to pay a fee commensurate with the time expended on his case. Any successful physician, whether he wills or no, by the law of selection, gradually acquires a practice along the lines he loves best, and in which he is most skilled. The oculist who acquires a reputation as a cataract operator, as a pathologist, as an authority on obscure fundus lesions, plastic work, or what not, will not be overrun with refractive work, particularly if he avoids it, or underestimates its importance. Since he does not use drops, or correct small errors of refraction, he considers the claims of the enthusiastic refractionist as exaggerated, waiving them aside with scant consideration, and by virtue of his prestige and reputation carries the day in the minds of a majority of his colleagues.

In the opinion of the conservatives, my paper is, of course, a radical one, but I am sure many of the progressives will think I am too luke warm. There is always room for an honest difference of opinion, and wherein lies the necessity of doubting the other fellow's honesty or sincerity, no matter how much you may disagree with him. The difference in the point of view is everything. The Jew and the Mohammedan, the infidel and the Christian, the Protestant and the Catholic, are all equally sure that right is right, and wrong is wrong. The Supreme Court of the United

States frequently hands down a decision by a vote of five to four, yet no one questions the honesty, sincerity or intelligence of its Judges.

The eye strain theorists of disease and their opposers each have reason on their side. Many people who have marked error of refraction go through life joyous, efficient, optimistic, and scout your suggestion of the need of glasses. In others a refractive error of but moderate grade causes ill health, or even chronic invalidism, the proof thereof being their cure by proper glasses in thousands of instances.

There came into my office recently on the same day two patients illustrating this point. A man 49 years of age, who was wearing his approximate distance correction for near only. He read 20/15 with

D. +.75 S = \ominus +.75 cyl. axis 180

S. +.75 S = \ominus +1.00 cyl. axis 180

and Jaeger No. 1 with a +1.00 S added. He was a strong vigorous man, by occupation a broker, never had a headache, and declared he was in the best of health and spirits. He refused to consider the wearing of distance glasses except to play golf, and I wasted little time urging him to wear them at other times.

The other case was a young stenographer of twenty, who complained of severe headaches of daily occurrence. Her vision was 20/20+. Under homatropin she read 20/10 with

D. —.25 S = \ominus —.25 cyl. axis 180

S. —.25 S = \ominus —.25 cyl. axis 165

Muscle balance was normal, and with some misgiving I ordered glasses for her. At the end of a month she reported the complete disappearance of her headaches.

The psychic effect of properly fitted glasses given with the assurance that they will afford relief, is a factor well worth serious consideration. The reproach of the oculist is that he gives every one glasses, and far be it from me to say that all patients with refractive error should wear glasses, but that proper glasses cure headache, vertigo, nausea and vomiting, indigestion, insomnia, tinnitus, dyspepsia, flatulence, constipation, irritability, loss of energy, general ill health, migraine and even epilepsy, plenty of those here present can testify. Half the ills and discomforts of the menopause are the result of presbyopia, overlooked by the family doctor, and ignored by the patient, who does not wish to be considered old enough to wear glasses.

The future of our profession is said to lie in the field of pre-

ventive medicine. In our branch of the profession no greater opportunity is presented than in the proper fitting of glasses. In glaucoma, hyperopia or hyperopic astigmatism, is found in about 98 per cent of cases. While absolute proof is lacking, and much skepticism expressed by many oculists, I am firmly convinced that ametropia is a distinctly exciting cause of cataract. First let me ask you if you ever saw a case of uncomplicated senile cataract who did not show decided ametropia. In advanced cases, to be sure, this condition is difficult to diagnose, but in the incipient cases the presence of ametropia is easily detected, and in most instances no glasses or improper ones have been worn. Again consider the scarcity of cataract in private practice as compared with our clinical and hospital work. Our private practice is recruited from those who are more intelligent, and who are in a financial position to secure and wear proper glasses. It is a striking coincidence that in India and other countries where the use of the eyes for near work is much less owing to general illiteracy, the percentage of cataract is high. It would naturally be inferred that in a cultured and educated community, where the eyes were called upon to exercise the accommodative function, that cataract would be more prevalent, but the educated individual is actually forced to wear glasses for near work if he would pursue his usual occupations and pleasures, while the illiterate gets on as best he can.

Whatever theory of accommodation is accepted it is an active and not a passive process. To attempt near work after the age of presbyopia without glasses or with inadequate ones must surely result in excessive overwork of the ciliary muscle, and with resulting insult or trauma to the lens and its delicate fibers. It is therefore reasonable to suppose that uncorrected errors of refraction cause functional disease not only of the eyes, but elsewhere in the delicately adjusted human organism. The role of functional disorders in the causation of organic disease is too well known to necessitate amplification. The effect of glasses in the prevention and cure of convergent squint is a well-established fact.

As important as proper fitting by the oculist is proper fitting and adjustment by the optician. I always urge my patients to bring their glasses for inspection after they have had them a few days. It does away with the probability of error, as opticians are more particular to have the fitting exact if they know the work is to be inspected. When possible, properly centered spectacles with moderately heavy temples of 14 karat gold should be given.

Large lenses with hideous celluloid and other composition rims should be avoided, as they are nearly always too widely centered. A few years ago the young bud would balk at glasses, much less spectacles; she now welcomes these unsightly glasses because they are all the rage and affected by the ultra-fashionable.

In our ophthalmic hospitals undue prominence is given to pathology and therapeutics, and the internes care but little for the refractive cases. The work is all handled from the clinic or dispensary point of view. Post graduate students are generally taught refraction by the younger men. As soon as he can afford it the young oculist gives up teaching refraction. In the clinics the fitting is generally done by the junior assistant surgeons, who often do it hastily, that they may go to the dark room for pathological cases and to the operating room to watch operations, which they may not undertake for several years.

In the clinic who tests muscle balance or the amplitude of accommodation? Yet the young oculist during the first five years of his practice will derive from 75 per cent to 90 per cent of his income from the fitting of glasses. Every city of 5,000 population has a good living for an oculist who is a good refractionist. In the larger cities there is a field for an oculist who will limit his practice exclusively to the fitting of glasses.

The excessive fees of city oculists are in some measure responsible for the refracting optician evil, and the abuse of medical charity. One-half the patients at our charity eye hospitals can afford to pay \$2.00, \$3.00 or even \$5.00 for careful and proper refraction. The charge for fitting of glasses should be a lump sum, commensurate with the person's ability to pay. One opposition to the use of drops is the belief that the oculist is prolonging the case and making an excuse for extra visits.

Among the refracting opticians are found all grades of incompetence and dishonesty. The more skillful ones often pose as doctors and foster the belief that they are medical graduates. Patients frequently assure me that some notorious advertising optician is an oculist, or at least that he claims to be. From the cock-sure optometrist who thinks he is as good a fitter as the oculist, "Good Lord, Deliver Us."

It is useless to cite the thousands of cases we all have seen of improper fitting. Sometimes the glasses do not correct 25 per cent of the error present, and are often worse than none.

Conclusions:

First. While formerly the fitting of glasses was relegated to the maker of spectacles as beneath the dignity of the ophthalmologist, at present it constitutes the larger part of ophthalmic practice.

Second. While formerly it was thought unnecessary or even undesirable to use a cycloplegic, it is now conceded by most ophthalmologists that in patients under thirty-five the use of a cycloplegic is a necessity to accurate fitting.

Third. The ophthalmologist who persists in doing refraction without a cycloplegic is in the eyes of the patient, and often justly so, no better than the optician.

Fourth. The day of the superficial, careless, hurried, slipshod fitting is past, and to be successful and relieve the patient, careful and accurate refraction is necessary.

Fifth. The oculist who tells the patient he has not astigmatism enough to justify its correction is behind the times, and should follow Elbert Hubbard's advice to "get in line."

Sixth. At least fifty per cent of the headaches of civilized humanity are due to eye strain, and the general practitioner who treats a case of recurrent headache without having the patient's refractive condition investigated is as remiss as though he neglected blood pressure or urinalysis.

Seventh. As oculists we should avail ourselves of every opportunity to impress on the general practitioner, and the public, the fact that eye strain is a frequent cause of headache, insomnia, vertigo, nausea, failure of general health, and various nervous and psychic ailments.

Eighth. The unskillful and careless fitting by oculists in the past is in a large measure responsible for the presence among us of the eyesight specialist, or optometrist, and in many instances his fitting is but little worse than the oculist who does not find it necessary to employ a cycloplegic.

Ninth. Badly adjusted glasses are as often a cause of failure to relieve as improper fitting. Of the glasses worn today, less than twenty-five per cent are accurately fitted and properly adjusted.

Tenth. The accurate fitting of glasses to the young will reduce the ophthalmic surgery necessary in the later decades of life by at least ten per cent.

Eleventh. The way to eliminate the optometrist, is to rise to the occasion and do better work than he does. Oculists whose fitting is of the optometrist's standard should not complain of

his presence. The legislators and politicians will not listen to us until we show by our improved work that we exceed them in skill.

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TREATMENT OF ASTHENŌPIA DEPENDENT UPON ESOPHORIA RELATIVE TO NEAR WORK.

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Donders, in his classical essay, pointed out the close relationship of the intra and extra ocular muscles. If we accept his theory it follows that normally there is a definite ratio of convergence to accommodation. For every diopter of accommodation there must result one meter angle of convergence. In emmetropia, in order to use the eyes at a point 13" distant, the crystalline lens, by contraction of the ciliary muscle, is made to accommodate 3 dioptries, the visual axes likewise to converge 3 meter angles. The brain center that controls the ciliary muscles sends a corresponding associated impulse through the third conjugate innervation center to the internal recti equal to that sent to the ciliary muscles. If for any reason a stronger impulse is sent than is normally required to produce an accommodation of 3 dioptries, as in a sub-normally developed ciliary muscle, or insufficiency, convergence will necessarily be in excess of accommodation. To this condition has been given the name of sub-normal accommodation.

Duane has stated that in over 100 cases of insufficient accommodation that he examined there was a convergence excess in only 12 per cent; a convergence insufficiency, often very marked, in 44 per cent; other complicating muscular conditions in about 10 per cent, and normal muscular relations in 34 per cent.

The term sub-normal accommodation should be applied to those cases showing an actual deficiency in accommodation, rather than to convergence excess with a normal accommodative range.

Other observers in the same field of research, in an attempt to explain excessive convergence, propound the following: That the nerve cells controlling convergence and accommodation are entirely separate and independent in action, one of the other. The apparent normal ratio of convergence to accommodation is more the result of close association, or an inherent functional tendency, rather than equal distribution of nerve stimulus. We have these two functions capable of more or less dissociation, the abnormal tendency of one does not influence the normal action of the other, as is exemplified in cases where convergence continues unaltered when accommodation has been paralyzed. Assuming a case with orthophoria in the distance and near esophoria, and following the

line of thought that accommodation and convergence are capable of unequal stimulus, convergence in excess may occur in the presence of a normally acting ciliary muscle, as is evidenced by a normal range of accommodation. Therefore we must seek the cause of near esophoria, first in the innervation of the internal recti rather than a faulty development of the ciliary muscle.

Still others dismiss this very important subject of near esophoria, by ascribing to this condition an unusual demand upon accommodation, which would result in an abnormal tendency of the visual axes toward excessive convergence. Hyperopia, astigmatism and even myopia are mentioned as a complication in producing this anomaly.

If I might add my humble opinion to what has already been said in the discussion of this subject under consideration, I am inclined to divide honors, for I have not been able to convince myself that there is any one etiological factor generally applicable to all cases showing near esophoria.

First, let us consider those cases involving an underlying complication. Errors of refraction are to be looked upon as a causative factor in producing excessive convergence. We may term these cases—*accommodative*. In hypermetropia the eye must accommodate for distance as well as near, and this extra stimulus to accommodation will have a tendency to increase convergence. It follows that there must be a more or less close relationship aside from custom and habit, but not diopter for meter angle between accommodation and convergence. Granting the range of accommodation is usually normal, I hardly think we are justified in claiming insufficiency of the ciliary muscles, nor can we apply the theory of unequal nerve stimulus, because the disturbing element is real and not apparent. I merely mention the following example to illustrate the relation between a complicating refraction error and esotropia: Release of the deviation when spherical glasses tend to relieve the accommodation in a case of hyperopia and internal squint; a more beautiful example in favor of an error of refraction as a direct cause, rather than a complication, could not be given.

Muscular anomalies are next to be considered, and let me place emphasis upon any complicating vertical error. Indeed, it is an open question whether or not directing treatment to a vertical imbalance will not generally correct a lateral deviation. We see the correlation between the lateral and vertical external motor muscles without involving the muscle of accommodation. Second,

the study of those cases in which we can eliminate any coexisting complication. A case comes to mind which will best serve as an illustration. A young man, aged 30 years, has manifest hyperopia of a half diopter in either eye. Muscle status for infinity—orthophoria. At reading distance he has three degrees of esophoria. The accommodative near point is normal. The estimation of which should never be omitted, as this is the only means we have of ascertaining the status of the ciliary muscles. With these facts at hand, what is the cause of near esophoria or convergence in excess in this case? I should say a plausible explanation would be that any loss of equilibrium between these two forces, accommodation and convergence, must be the result of either unequal nerve stimulus or unequal response, whether originating from a common center or separate nuclei. Donders himself admitted that there might be a disparity between these two functions. To substantiate my argument we have only to consider what is termed a normal muscular balance, and note the variation between orthophoria for infinity and a deviation of four or five degrees for near. Even under normal conditions we do not have diopter for meter angle.

The presence of near esophoria, when occurring in the young, between the ages of fifteen and forty, may give rise to asthenopic symptoms that demand special attention. Uncomplicated, it causes its possessor little annoyance, save in near point accommodation. After forty, near esophoria when complicating presbyopia may or may not call for a stronger reading glass than is usually required. Perhaps this last statement calls for a more definite explanation. We may take for an example a presbyope, age 45 years, who has been made emmetropic by the addition of his distant correction. If we now measure his accommodation we find his near point has receded, but within normal limits. It has been my observation to note in these cases of near esophoria, that in order to bring the near point within normal reading distance requires stronger plus lenses than one would expect to prescribe for a patient with a corresponding age. The greater the refractive error the more likely is this to occur. No doubt the accommodative efforts throughout early adult life can explain this phenomenon, as near esophoria symptoms pertain to prolonged use of the eyes for near work.

The question is often asked, What is orthophoria, and in the advent of near esophoria how are we to proceed in the study and treatment of these cases? When testing the lateral motor muscles

at 20', vertical diplopia being induced by placing a six or eight degree colored prism base down before either eye in a trial frame, the condition known as orthophoria is present when one light is directly above the other. The vertical diplopia test at reading distance would normally show a divergence varying from two to six prism degrees. This divergence represents the direction of the visual axes assumed in a position of rest. When an exophoria of at least two degrees is not present in near muscle testing, we are justified in classifying these cases as muscular imbalance. I am inclined to look upon an exophoria of one or two degrees as rather minor in importance, when compared to a near "orthophoria," i. e., when one light is vertically above the other, or a variable esophoria. This condition would be decidedly abnormal and more likely to call for interference. Let me reiterate, please, the limitations above mentioned, as to what is termed a normal and abnormal muscle balance, have reference to the vertical prism diplopia test only. Our estimations would be entirely different if we were to use, for instance, the multiple Maddox rod and a point of light either for infinity or reading distance. Thus I have found a variation of as much as three prism degrees when making a comparison between these two tests. This point should be constantly borne in mind. I do not wish to impress the reader with the thought that the prism diplopia test is attended with a greater degree of accuracy than either the screen test or the time-honored Maddox rod. Not so; each has, and will always have, its advocates. It is well for one to familiarize himself with the normal limitations in each particular test. I will say emphatically, however, that our results will be far more satisfactory if we confine ourselves to one method of testing, repeating this often, rather than inject into one or two examinations the Maddox rod, the screen test or the vertical diplopia test and then make a comparison between the results obtained. I prefer a colored prism (a description of which shall be given later), whenever I use the prism diplopia test for near or infinity. A tiny point of light will naturally have to be used in place of the dot. The red or blue prism facilitates of a more intelligent answer from our patient. It would, perhaps, not be remiss to consider the usual routine and methods of diagnosis before taking up the subject of treatment.

Methods of examination. We usually test the muscles of patients who come wearing glasses both for infinity and reading distance with their correction on. In all of our cases hyoscine hydrobromate gr. $\frac{1}{2}$ to the ounce is used as a cycloplegic. We are in

the habit of making four instillations, two before bedtime, with one hour interval, the day before coming to the office, and two in the morning on rising, with one hour interval also. We have used hyoscine (almost to the exclusion of all other drugs, except atropin in those under 15 years of age) with impunity, and have never seen any bad results following its use. As a cyclopegic it is far more reliable and its action more instantaneous than homatropin. Its effect usually lasts four days, but for those who are employed a drop of 1% solution of eserine two or three times a day will hasten contraction of the pupils. Our patients are then skiascoped, and the result compared with that found at the trial case.

The muscle status is made with and without the post cycloplegic correction. For this Duane's screen and parallax test both for distance and near are worthy of special mention, because of simplicity and accuracy. The patient is told to direct his attention to a small electric light six meters away, a card is passed from one eye to the other and the deviation of the eye behind the screen is corrected by adding prisms, until the deviation is slightly reversed. A deduction of two prism degrees is allowed for this reversal, from the total deviation. The parallax test is subjective. The patient notices the apparent movement of the object as the card is carried back and forth. In exophoria the movement is with and in esophoria against the movement on the card. In near testing a 2 mm. white dot on a black card is used. Both tests are made at the same time.

The multiple Maddox rod and vertical diplopia test should also be made. An electric light from a luminous ophthalmoscope over which a cap is placed containing four apertures, varying from 1 to 4 mm. in diameter, is used in conjunction with the Maddox rod or prism diplopia test at 13". These millimeter openings give a more concentrated light with very little radiation. For distant testing a black chimney with an iris diaphragm, over an electric light, has long since displaced the candle. A five or six degree prism, blue or red, is placed base down in the trial frame to produce vertical diplopia. Prisms made by Wall and Ochs (an improvement over those found in the trial case) are set in a 4 mm. brass rim, which is marked to indicate its position. Patients should be charged to lend their hearty co-operation, to fix sharply on the test objects and maintain steady fixation throughout the examination. This is essential if our results are to be accurate.

The convergence near point is also recorded with this small

electric light. The patient is directed to concentrate on the light as it is carried toward the nose in the median line, and the observer notices the behavior of the corneal images as the eye to which it belongs ceases to converge. The meter angles of positive convergence can be readily calculated for the patient's near point.

Prism duccion is usually recorded with square prisms held before the patient's eye. Abduction testing, both for distance and near, should never be omitted. The accommodative near point is obtained with a Prince rule and either Duane's disc (a .25 mm. black line bisecting a rectangular white card 3 mm. long and 1.25 mm. wide on a black surface) or fine print.

We may sum up for final consideration: The importance of a reliable cycloplegic in measuring the refraction; the muscle balance for infinity and near with the patient's correction, a mean proportion is to be taken after repeated trials, using the same tests to avoid confusion; the accommodative near point with Duane's hair line; and finally, the estimation of abduction.

Treatment. We shall deal with this subject from a therapeutic standpoint. No effort is made to include under this heading cases in which operative interference is indicated. In discussing the etiology of near esophoria we considered the majority of these cases as accommodative, i. e., a faulty association between accommodation and convergence in the presence of hypermetropia or allied conditions. Next in order, extrinsic muscular anomalies, either lateral or vertical, and a few cases showing true subnormal accommodation. Finally those cases the etiology of which is not definitely known. The theory of unequal nerve stimuli or response might be applied and the treatment would be empirical. The evidence as has heretofore been presented in full justifies this inference. We proceed, therefore, with a thorough examination of any existing refractive error, under complete paralysis of accommodation, and prescribing (especially when esophoria of greater or less degree is present for infinity) as nearly a full correction as can be comfortably worn, thus relieving the inherent nervous tension of the internal recti and restoring a lost equilibrium between accommodation and convergence. However, in the young especially, whose ciliary muscles are vigorously active, a full correction cannot be worn without producing ciliary spasm, thereby necessitating a compromise in the strength of the lenses prescribed for constant wear. *Our aim should be, first, to correct all latent hyperopia.* This is by no means easy for those who have never worn glasses. If we are compelled to continue treatment and a

review of the case offers no solution, we feel justified in prescribing in addition to the distant correction a near glass, adding that which was deducted from the total correction under static refraction. For an example, if under drops a patient has four dioptres of hyperopia and he accepts but three for infinity, the remaining one dioptre is added for reading. The esophoria for near as well as infinity will vary in reduction according to the strength of our spheres, but not dioptre for prism degree. Sometimes patients accept their full correction and the addition of a weak sphere will be necessary for comfortable near work. The presence of esophoria in near muscle testing may call for treatment independent of any co-existing refraction error. Thus in 1910, a patient, age 31, with no occupation other than household duties, came under observation, complaining of headaches. On examination under hyoscine, a half dioptre hyperopic astigmatism was found in either eye. Muscle balance: for infinity 2° esophoria; tested at $13''$ — 3° esophoria. Abduction 5° for infinity, 9° for near. Accommodative near point $5\frac{1}{2}$ D. Prescribed for constant wear $+50$ cyl. axis 90, either eye. This the patient wore with comfort for thirteen months, at the end of which time she returned complaining of asthenopic symptoms and stated she had just accepted a position doing clerical work. Re-examination. Skiascoped under hyoscine and $+37$ cyl. axis 90 in either eye measured. The muscle balance for infinity, after repeated tests, showed a mean proportion of $1\frac{1}{2}^{\circ}$ esophoria, and 3° for near. Abduction for near $9\frac{1}{2}$. Accommodative near point 5 D.

O. D. $+37$ C. ax. 90

O. S. $+37$ C. ax. 90

Added for near $+1.00$ sphere. Invisible bifocals. These she is still wearing.

There are no hard and fast rules as to what strength sphere is to be added. Begin by adding a weak plus, usually a one dioptre, in esophoria varying from one to six degrees. Just as we, in prescribing prisms for exophoria or esophoria, begin by adding weak spheres. Stronger lenses will necessitate a close range and at the same time magnify. *Invisible bifocals* should have precedence over two pairs of glasses, both for convenience and comfort. *Prisms added or decentering spherical lenses will not be necessary* unless complicating an esophoria for distance.

Suppression of accommodation and convergence; described in many-text books by having the patient read with a pair of strong spherical lenses, usually a plus three or four dioptre sphere, in

addition to his regular correction. These may be used in the form of hook fronts, two or three times a day. I have given this suggestion a thorough trial and find that most patients are greatly annoyed by the additional strong glasses, and although asthenopic symptoms are sometimes relieved they are more often prone to recur.

Esophoria associated with myopia may be relieved by removing the glasses for near work or the addition of a weak plus sphere. Esophoria in those with beginning presbyopic symptoms may be relieved by wearing their full correction which will correct any latent hyperopia as manifested under complete paralysis of accommodation.

A further consideration of near esophoria in which can be demonstrated either a vertical error or under-action on the part of the abductors. Prisms in a position of rest are in order for vertical deviations. It has been previously stated that when vertical errors are corrected lateral tendencies are likewise held in abeyance. For the weak abductors we recommend prism training. Abduction varies from four to seven prism degrees for infinity and eight to fourteen for 13". Calculations are based on prism ducession. Abduction below normal for near invariably means weak ducession for infinity. Prism training should be ordered for distance as well as near. There are several methods of exercising weak external recti muscles, all of which by alternate contraction and relaxation tend to increase the blood supply to the parts. Exercises for infinity may be begun with a pair of three or four degree prisms base in, held in a square frame. With these the patient is made to approach a lighted candle at the end of the room and on a level with the eyes. In going toward the light the frame should be raised until within a few feet of the candle, when the glasses are adjusted and the patient withdraws from the light to his former position. If diplopia is produced, he immediately raises the frames and approaches the light. At the end of the first week stronger prisms may replace those of less strength. Or if the patient elects he may remain seated and hold the square prism before either eye for a second and then remove it. This may be done three or four times in succession. Start with weak combinations and gradually increase the strength. For near the patient may use a card, in the center of which is a dot 2 or 3 mm. in diameter, which he holds in one hand and with the other his prism. Exercises should be taken at stated intervals, preferably night and morning. They should last not longer than three or four minutes at each seance

and should always be short of fatigue. Prism reading may also be tried. The patient is instructed to read fifteen minutes to half an hour, two or three times a day, with a pair of nine or ten degree prisms, base in, holding the reading at first close and then gradually approaching the normal convergence angle.

The following case histories here appended will serve to illustrate the use of additional plus glasses in the young for near work:

Case 1. Miss E. F., age 30. Occupation, sewing. History: Has been wearing glasses for past sixteen years. Present complaint, headaches, more or less constantly, aggravated after close work.

Vision: O. D. 20/20, D. S. 20/30.

Skiascopy under hyoscine:

O. D. +1.25 cyl. axis 105°.

O. S. +1.25 cyl. axis 75°.

Trial case:

O. D. +0.25 sph.=+1.25 cyl. axis 105°.

O. S. +0.25 sph.=+1.25 cyl. axis 75°.

Muscle status with above correction: (Post cycloplegic), esophoria 1° 20'. Esophoria, 3° 13". Convergence near point, 4 inches. Abduction, 5½ for infinity; abduction at the reading distance, 10°. Accommodative near point, 7½ D. Duane's disc used.

Prescribed for constant use:

O. D. +1.25 cyl. axis 105.

O. S. +1.25 cyl. axis 75.

Patient returned several months later complaining of asthenopic symptoms. The muscle status again tested with correction and esophoria of 4° found at 13". Abduction 8° for near. With a pair of +5.00 added to distant correction orthophoria to 1° exophoria produced. Patient given prism exercises for reading, and convergence repression with a pair 3.00 sph. hook fronts. There were discarded after one month owing to discouragement and lack of interest on the part of the patient. A pair of invisible bifocals adding to +1.00 sph. for reading has been altogether satisfactory.

Case 2. Mr. Wm. J. J., age 25. Occupation, clerk. History: Patient has worn glasses prescribed several years ago. Complains of headaches toward evening.

Vision: O. D. 20/20? O. S. 20/20?

Skiascopy under hyoscine:

O. D. +2.25 sph.=+0.25 cyl. axis 90.

O. S. +2.50 sph.=+0.25 cyl. axis 90.

Case:

O. D. +2.50 sph.=+0.25 cyl. axis 90.

O. S. +2.75 sph.=+0.25 cyl. axis 90.

Muscle status with correction: Esophoria, $2^{\circ} 13''$; esophoria, $3\frac{1}{2}^{\circ} 20'$. Abduction, $2\frac{1}{2}^{\circ}$; distance abduction, 5° for near. Convergence near point, 1 inch. Accommodative near point, $8\frac{1}{2}$ D.

O. D. +2.50. sph.=0.25 cyl. axis 90.

O. S. +2.75. sph.=0.25 cyl. axis 90.

Constant use.

Patient returned one month later still complaining of asthenopic symptoms only after close application. Muscles again tested with correction, 3° esophoria in distance. 5° esophoria for near. Ordered prism reading with a pair of 10° prisms base in along with prism exercises, beginning with a 2° for distance and 5° prism for near. Notwithstanding my persuasion, these were discarded after two weeks' trial. A pair of reading glasses ordered, adding a plus one dioptré sphere. Results most satisfactory, save for the inconvenience of two pair of glasses. Invisible bifocals ordered six months later.

Case 3—Mrs. W. F. B. Age 33. History: Has worn glasses for several years prescribed by an optician. These gave only temporary relief. Complains of headaches, nausea, blurred vision and inability to ride in a street car without becoming sick.

Vision: O. D. 20/20? O. S. 20/20?

Skiascopy under hyoscine:

O. D. +3.50 sph.=0.75 cyl. axis 90.

O. S. +3.50 sph.=0.50 cyl. axis 90.

Case:

O. D. +3.50 sph.=0.75 cyl. axis 90.

O. S. +3.50 sph.=0.50 cyl. axis 90. Vision full.

Muscle status, wearing correction: esophoria 4° for near, esophoria 5° for distance. Convergence near point 2 inches. Accommodative near point, $5\frac{1}{2}$ D. Abd. $5^{\circ} 20'$ abd. $9\frac{1}{2}^{\circ}$ near.

O. D. +3.00 sph.=0.75 cyl. axis 90.

O. S. +3.00 sph.=0.50 cyl. axis 90.

Patient returns seven months later very much improved, headaches and nausea disappeared entirely, but close work seems to blur, and after several hours of constant use, her eyes become tired.

Muscle status again tested with her glasses, and practically the same amount of esophoria as previously found. A+7.00 sph. added produced orthophoria or 1° exophoria for near.

Prescribed for constant use her full correction:

O. D. +3.50 sph.=0.75 cyl. axis 90.

O. S. +3.50 sph.=0.75 cyl. axis 90.

She was told to return in a month's time. Result: While improved, she is not able to continue her sewing without tiring, ordered another pair of glasses for near work adding a plus 1.50 sphere. Comfortable up to the present time.

Case 4—Mr. E. V. Age 26. Occupation clerk. History: Patient complains of drowsiness and blurring of near work after using his eyes longer than half hour. Vision in either eye full.

Skiascopy under hyoscine:

O. D. +0.25 sph.

O. S. +0.25 cyl. axis 90.

Trial case:

O. D. +0.25 sph.

O. S. +0.25 cyl. axis 90.

Muscle balance (patient wearing correction); orthophoria for distance, 4° esophoria near. Abd. 14°, near testing. Convergence near point 3 inches. Accommodative near point, 9½ D.

O. D. +0.25 sph.

O. S. +0.25 cpl. axis 90.

Constant use.

Patient returned two months later with little if any improvement. Repeated testing revealed 5° esophoria 13", orthophoria 20'. Original correction discarded. Patient was given a pair of +3.00 sph. to be used in near work three times a day, each seance lasting one hour the first week, increasing an hour each succeeding week, for a period of four weeks. Unfortunately the strong glasses annoyed the patient so much that they were laid aside in a few days.

A pair of +1.00 sph. with a quarter cylinder in the left eye, was prescribed for near work. Asthenopic symptoms promptly relieved.

Case 5—Miss M. W. Age 25. History: Has worn glasses previously prescribed. Complains of headaches occasionally, but more especially the inability to use her eyes for prolonged close work.

Vision: O. D. 20/20. O. S. 20/20. Partly.

Skiascopy under hyoscine:

O. D. +0.75=0.75 cyl. axis 90.

O. S. +0.75=0.75 cyl. axis 90.

Trial case:

O. D. +0.50—0.75 cyl. axis 90.

O. S. +0.50—0.87 cyl. axis 90.

Muscle balance wearing the above correction, post cycloplegic:

Esophoria $1^{\circ} 13''$. Orthophoria $20'$. Convergence near point 2 inches. Accommodative near point, 10 D. Abduction 4° for infinity abduction 8° for reading distance.

Prescribed:

O. D. $+0.50$ sph.= 0.75 cyl. axis 90.

O. S. $+0.50$ sph.= 0.87 cyl. axis 90.

Adding a $+1.25$ sph. invisible bifocals.

Fortunately the bifocals caused little if any annoyance and the result was most gratifying.

To recapitulate: The presence of esophoria in near muscle testing of patients who continue to complain of asthenopic symptoms (especially after prolonged use of the eyes in near work, and who have not been relieved by wearing their proper correction), is indicative of convergence excess. *Refraction under a reliable cycloplegic* (preferably hyoscine, for reasons stated) and prescribing glasses that will correct all latent hyperopia. Due consideration should be given the abductors, when under-acting, and prism training with prism reading is meritorious. *Measuring the accommodative near point* with Duane's disk (patients always wearing their correction) is of paramount importance. In hyperopia, when compelled to reduce the spheres for distant vision, let the near glass added equal the amount necessary to produce the total correction. Whenever spheres are otherwise added begin by adding a weak plus three-quarter or one dioptré. *Invisible bifocals* are far better than two pairs of glasses.

508 Park Avenue.

THE ADAPTATION OF THE TEST CARD TO ITS DOUBLE FUNCTION.

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The test card is in common use for two quite distinct purposes: (A) It furnishes a test for visual acuity, by which the great mass of our records of vision are obtained. (B) It serves as an apparatus with which successive changes in visual acuity, by improvements in focussing on the retina, may be followed for the subjective measurement of ametropia. As with most pieces of apparatus designed to serve two different purposes, it is not perfectly adapted to either.

For the simple testing of visual acuity, as for testing the sight of school children or railway employes, the usual test card will in time give place to some such simple form of test as the International Broken Ring. But for the subjective testing of refraction, the card of test letters, imperfect as it is today, is for the mass of patients, far superior to any other means at our command. As it exists, it is much better adapted to this purpose than for giving valuable records of visual acuity. But even if it were used only for testing refraction, we still would wish to be able to record directly from the test card the vision obtained with the combination of lenses used. So we will always need to have it fitted to performing both functions.

As a test for visual acuity (A), each letter, or each line of letters should have a definite and known visual value; and there **should be a known and fairly equal difference of visual value** between the successive lines. On the other hand the series of test letters is of more value for the subjective testing of refraction (B) in proportion as it is a continuous series without considerable breaks in it. For testing visual acuity we must know just what it means when a certain line of letters is read at a certain distance; and the ideal arrangement for this purpose would be to have all these letters just visible at the same distance. For the subjective testing of refraction the ideal arrangement is one that will show every improvement in the lenses by the recognition of at least one additional letter, the letters on each line differing from each other in visibility, and some of the letters next smaller becoming visible as soon as all of the larger size had been recognized, thus furnishing a continuous series.

When Snellen, acting on Donders' suggestion attempted to ar-

range a series of test type in which the size of the letter should bear a definite relation to the distance at which it should be seen (5 minute angle), he immediately encountered the enormously differing visibility of different letters subtending the same angle. For his test cards he at once rejected all lower case letters, and all capitals except the one block letter form. Later he narrowed the series down by excluding many of the capital letters of the alphabet, leaving only fourteen which he used. Yet when we come to compare these with a definite standard, like the international standard, or the Snellen illiterate test, we find that among these fourteen letters the visibility varies over 30 per cent., the B can be recognized at only 20 feet, while the O of the same size is recognized at 28 feet.

Oliver carried this selection of letters still farther, rejecting all but seven. Yet these varied over 20 per cent. in visibility. But others who have arranged test cards have extended the number of letters employed until, on cards now in use, almost every letter in the Roman alphabet has been employed. While other alphabets, as the German, Hebrew, and Slavic are also in use for sight testing in this country.

The exclusion of letters has been to secure closer conformity to a definite standard of visual acuteness. Yet Oliver's card varies one-fifth in the significance of the different letters used; although for the smaller letters it has sacrificed the continuity of the series on which chiefly depends the value of a test card for the subjective measurement of errors of refraction.

But the most striking absurdities in our test cards have arisen from failure to recognize the relative visibility of the letters employed in particular lines. This causes striking gaps in one part of a series and overlapping in other parts. On our test cards there are lines of letters in which there is not more than five per cent. difference between the distance at which one can recognize the easiest letter, and the distance at which he can the most difficult. There are other lines for which the difference is fully fifty per cent. There are test cards, as Oliver's, on which there is a distinct gap between successive lines of letters. There are other cards on which before all the letters on one line can be read, half of the letters may be recognized on the line of next smaller letters. There are even some cards in use on which all the letters on the six meter line can be recognized slightly farther away than all the letters on the seven and a half meter line. The single 60 meter letters that head most of our test cards indicate widely different

degrees of visual acuity. These vary in significance when the card is used at 5 meters from .07 to .12 vision.

To meet these differences in the visibility of different letters and render more exact our records of visual acuity most of us have resorted to the expedient of supplementing the fractional record suggested by Snellen, by adding some word or sign, as "6/6 mostly," "6/6 partly," "5/4 plus," or "5/4 minus." When making all records of visual acuity from one card this does give them exactness. But when the records made from one card come to be compared with records made from another card, it simply introduces a new source of confusion. The 5/5 partly of one card may be a record of better vision than the 5/4 mostly from another card. The more definitely exact we attempt to be with a variable scale, the greater the confusion we have to encounter.

So long as a constant figure like the Snellen illiterate test or the broken ring is used, the proportioning of the size to the distance at which it should be seen by the eye with normal vision constitutes an advance over the empirical method, on which series of test letters had previously been based. But with letters or figures varying greatly in visibility there is no substitute for the actual trial of visibility, the empirical method of ascertaining the real visual significance of each letter. The substitution of the subtended angle for tests of visibility has led to many absurdities in our test cards.

One firm has published a card with very large letters to render possible the testing of very poor vision at the usual distance; the top letter is marked for 150 M., the second for 100 M., and the third for 60 M. Ignoring the different visibility of the different letters they made the largest letter B, and the smallest T. Consequently, although the letters fill the card so as to leave a very insufficient margin, they form a very poor series. The 150 meter letter is seen but little farther than the 60 meter letter on some other cards; and less than half as far again as the 60 meter letter on this card. Had the sizes of the B and T been reversed the largest letter could have been seen almost twice as far, and the series would have covered variation in visual acuity more than three times as great.

One of the cards of figures arranged for testing young children begins with a clock dial that occupies a square subtending an angle of five minutes at 60 meters. So it is numbered as a 60 meter test. But to recognize it as a clock dial one must recognize that there are hands and hours marked on it. To do this requires as good vision as to recognize the usual 12 meter line of Snellen

letters. Although it subtends the five minute angle at 60 meters, it belongs with the 12 meter line as a visual test.

Enough has been said to illustrate that only when the same figure or letter is used does the distance of visibility bear a fixed relation to its size. If we are to rely on a card printed with two or more letters the visual value of these letters must be actually tested by some fixed standard before the card can be regarded as furnishing a scientific test. When this has been done it will be possible to use various letters or figures, and get results of scientific accuracy. In what a haphazard manner test letters have been used in the past has been illustrated in some of the instances given above. But it has been most forcibly brought out by the collective study conducted by the committee of the section on ophthalmology of the American Medical Association appointed to undertake the standardizing of test cards.

The report of this committee, just published in the transactions of the section, shows the extremely imperfect character of the test cards in common use in this country. Very many of these cards have lines of letters on which the letter easiest to recognize can be recognized 50 per cent. farther than the letter hardest to recognize. In tables appended to the report an attempt is made to give the significance of recognizing half the letters on each line, and all the letters on the line. The difference in visual value between seeing half the letters and all the letters was in no line less than 5 per cent. It was often as high as 50 per cent. But these figures scarcely indicate the whole difficulty. Very often almost the whole difference between recognizing half the letters and all the letters on the line depended on the difficulty of seeing a single letter. Perhaps nine-tenths of the letters would be recognized almost as easily as one-half. Then would come a single letter like B, S, or a defective G, or a poorly printed R, that could only be made out at a much shorter distance. On other lines no such difficult letter would be used, and in this way the series of lines becomes far more irregular in visual significance than the variations in size or subtended angle would indicate.

To sum up: The most serious defects in our test cards are due to failure to recognize the practical importance of differences in visibility between different letters and figures subtending the same angle that are used upon such cards. The variations thus introduced are many times greater and more serious than those caused by measuring the angle on the sine, arc or tangent, or failing to place the card so that the patient's line of sight shall be perpendicular to it. They are worse even than the variations in the color

and character of the surface on which the letters are printed, and quite as misleading and far more difficult to guard against, than variations in the lighting of the test cards.

The remedy for such defects is the careful standardizing of the letters used. Something of this kind has been undertaken by the committee of the section on ophthalmology of the American Medical Association. But the subject deserves careful thought on the part of every one who uses test cards, and some effort to thus standardize his own cards. To apply to those cards, and utilize the tables prepared by the committee above mentioned, will be of great value in promoting exactness in all our records of visual acuity.

THE COLOR AND MORAL SENSE.

GEORGE HENRY TAYLOR.

RAILWAY MEDICAL OFFICER

NEW SOUTH WALES

In reprinting this Article on "The Color and the Moral Sense" the Editor is guided in part by the fact that there was but little notice taken at the time of Dr. Taylor's work, the articles having been published in various Journals and mostly under the title of "Correspondence"; the Author stating in his letter of August 28th, 1915, addressed to the Editor, that only 60 reprints were sent out for private circulation.

Color blindness, as is well known, exists in about 5% of males and possibly half that proportion of females. In the experience of the Editor, he has invariably found other defects which might be classed as "stigmata of degeneracy" and in his business and professional relations with certain persons, whom he found out by examination or observation to be color blind or color defective, there has been a mental obliquity, which agrees in some respects with Taylor's observations.—EDITOR.

It may appear to many persons an act wanting in judgment for a man of ordinary mind-endowment to obtrude his opinion in the form of a pamphlet for criticism by trained observers. A writer may, however, have a claim for consideration on other minds by reason of a wide clinical experience of certain types of men. This experience in my case covers three years in Hospitals for Insane, three years Resident Surgeon in a large gaol, two years Medical Superintendent of a large public hospital and lazaret, thirteen years as second Government Medical Officer for Sydney, and Pathologist to the City Coroner. This work entailed an evening visit to Darlinghurst Gaol, the examination of every person arrested by the police in Sydney as insane, a daily attendance at the Hospital Admission Depot, work amongst the destitute sick, and attendance at the Police, Criminal, and Coroner's Courts. I have also acted for three and a half years as Railway Medical Officer for New South Wales.* The sum of human intelligence may be compared to a brilliant white light built up of millions of minute beams, each beam the individual contribution of a human mind. To this body of light, no contribution, however small but has its value, and my little beam is the best I can give.

The average wage-earner in the large class of persons who live by labor, male and female, is not less intelligent than the average man or woman in the small class of persons who by birth are admitted to all the privileges of education, and is frequently more useful as a citizen. The senses of color and of musical sounds,

*As written in 1910. Now the author has served about 9 years in this capacity.

although by inheritance equal in each class, are in the case of the wage-earner frequently uneducated, the struggle for daily bread not being assisted by the training of such senses. The moral sense is probably equally developed in both classes, but the privileged class is the more emotional. The emotional type in its highest degree is the type in which there is found a keen appreciation of color. The marked unrest in our present social conditions is obviously due to a large extent to general education. The privileged class were formerly secure in the enjoyment of what they did not earn because of a want of education in the masses. Ours is a period of upheaval the dominant condition of which is intelligence on the one hand and moral sense without color on the other.

A person may be deaf to musical sounds, blind to color, and blind to the appeal of moral sense, and still have an acute and intelligent mind. The supreme artist must at least have a normal condition of each sense and a keen condition of one of them. His mind must be acute and highly educated. A moral blind could not appreciate the appeal of Miller's *Angelus* in the same degree as a person with a normal moral sense could, nor could a person with no recognition of color have composed the music of Mozart. It is demonstrable that the absence or presence of any sense shows itself in the face of a man or woman. To value such a face under favorable conditions it must be in repose and the mind interested. A degree of what in a normal mind would cause uncertainty or anxiety is of assistance when valuing a face. It is more easily done when faces are in contrast and there is common appeal to the different minds of those under criticism. A person who is blind to color, however intelligent and alert the mind may be, when contrasted with a face of less intelligence but with mental appreciation of color, is seen to be wanting in warmth and humor. In spite of his intelligence he appears to be dull by contrast. This is more clearly in evidence in young persons and in the wage-earning class. They are not trained as the privileged classes are to hide their emotions. When persons are examined for admission into the Railway Service, the mind of each candidate is more or less anxious. The candidate with normal color-sense is frequently nervous and tremulous when selecting the wools. In this he is in marked contrast to a person who is blind to color. The expression of face is, however, occasionally obscured by the exceptional vitality and mental vigor of the person examined.

The sense of music and the sense of color are closely allied. In the appeal to a musical person who is uneducated, the appeal is

purely emotional, a combination of his sense of color and his sense of sound. In the highly educated musician there is a greater appeal to the mind, and in what is termed the advanced music of today the endeavor appears to make the appeal direct to the mind. The keen appreciation of the appeal of color which gives to the face brightness and warmth is, I have found, frequently associated with a defective moral sense, so that the color appreciative person may be intensely selfish and be even dangerous as a citizen. The moral sense in itself is not emotional. It is its association with color-sense which makes it appear so. I do not confuse genuine emotion and warmth with the pseudo emotion of an hysterical person or the raving of a mind in a state of riot. It is a genuine appeal of the sense to the intellect and a recognition by the brain of the appeal. The keen appreciation of color in a man or woman I regard as a dangerous condition if unprotected by a normal moral sense. The latter is of supreme importance to society, the other only of importance to a limited number of persons.

A man who is convicted of crime is frequently a person with a normal moral sense. An unstable mind, either inherited or acquired from alcoholic habits or disease of the brain, explains his act. Many persons who are really epileptic, but with no history of a fit, only an epilepsy affecting the mind in outburst, have been imprisoned or hanged. The dreadful moral blind, with his calculating mind, frequently startles society by his acts, but the educated and highly intelligent moral blind is rarely convicted. He is protected by his mind. When his mind is uneducated or defective, he is the ordinary dangerous criminal, a man who generally goes to the scaffold without any evidence of fear or remorse.

To endeavor to educate the moral sense of such a person, is as reasonable as an endeavor to teach a color blind to appreciate color, or a tone deaf person to appreciate music.

Again a young mind does not appreciate the physiological processes ever at work in his organs the termination of which is death. The old and educated mind does.

The artist to be successful must make the emotions the servants of his mind. They assist in the teaching of the mind, but the mind must be supreme. This is not only the case with artists, but with all men and women who lead the intellectual life, whether it is in business, science or in dominating other minds. As the world has a life in the same way as a human being has a life, the time must come when the supreme appeal to the intellect will be a possibility of extinction. The nearer we get to a natural law the

farther we are removed from the appeal of the special senses. We will probably then have less need of our special senses and more need of pure reason.

TESTS FOR COLOR VISION IN NEW SOUTH WALES.

From the *Railway Age Gazette*, November 18, 1910.

[Also published in *The British Medical Journal*, June 7, 1910.]

Since 1906 the tests for color sense of candidates for employment in the New South Wales Government Railway service have been Holmgren's wools and Williams' lantern. The retesting of men for color vision on the running lines has been by Williams' lantern alone. Experience having shown that owing to the disks moving in a regular sequence the colors in the Williams lantern could be learned by a person with defective color sense, experiments were entered upon in order to devise some modification whereby any color or combination of colors could be shown at the will of the examiner. As a result of these experiments the lantern shown in the photograph was designed and made by the interlocking engineer of the New South Wales Railways, Charles Wilkin. The colored glasses in the Williams lantern are retained, but by the introduction of a second disk various combinations can be shown at the will of the examiner. The disks are rotated by handles at the side of the lantern. Pointers attached to these handles indicate on a vernier the numbers of the lights shown. The original numbers are retained, so that no alteration has been necessary in the method of keeping the records.

Any method of color testing depreciates in value when it is used to tutor intending candidates, and this openly done in regard to Holmgren's wool test and the old Williams lantern. It is remarkable how a candidate in whom a defective color sense has been clearly demonstrated, even a defective sense of red, can be tutored in the wools and the old lantern to deceive an examiner. As his sense of shade, however, is never reliable, he may suddenly, after naming correctly a number of red and green disks, name a red, green or white. If examined by a method new to him detection is not difficult. The key to a candidate's color sense is undoubtedly his sense of green. The smallest degree of defect revealed by the modified lantern is failing to see color in the two pale greens and calling them white. This defect is not invariably confirmed by Nagel. The two pale greens show one with a little more color in it than the other. When a candidate, with both of them in view names one white and other green, it indicates a more serious color defect. This is, in the cases I have tested, always confirmed by

examination with Nagel, the distinction being that the candidate in naming one white and the other green is using his sense of shade and not his sense of color. The conflict of opinion that occasionally occurs in different examinations of a candidate by Holmgren's wools is due in a majority of cases to atmospherical conditions. In an unsatisfactory light a man with a feeble color sense may fail in his green test and satisfy the examiner under more favorable conditions of light. In the Nagel test, which is a severe one, but which could be learned by an incomplete color blind, a good light is absolutely necessary. In a failing light or in gas-light persons with normal color-sense confuse the gray spots with green. If a candidate confuses red with green or green with red he is recognized by public opinion as a color blind. If he sees no color in red and calls red white, there is also a certain degree of appeal to the ordinary man; but if he confuses pale-green with white in the lantern test, or if in matching green in Holmgren's his only mistake is to pick gray or brown wools, the uneducated man is not impressed.

A color-blind engine-driver is protected from mistake under favorable conditions (1) by his perception of shade, the signal lights used, red and green, being of a standard pattern; (2) by his exact knowledge of the locality of distant and home signals; they are not flashed upon him suddenly; (3) by the color sense of his fireman. In shunting operations, however, where a confusion between white and green may at least imperil the life of a shunter, he must act promptly, guided entirely by his sense of green.

About 12,000 men have been examined in the medical officer's rooms in regard to color-sense since my appointment two years ago. Of these, 4.92 per cent. were found to have defective color-sense; classified as red blind, 2.16 per cent.; green blind, .12 per cent.; incomplete color blind, 1.12 per cent., and feeble color-sense, .41 per cent.; and 1.12 per cent. failed only in the lantern, the failures in the lantern being subsequently confirmed by Nagel's method. I am satisfied that a man should not be admitted to the railway service as a worker on the running lines who in any degree has a defective sense of red or green, and that a man in the service and working on the running lines must be regarded as unfit if it can be shown that he fails to recognize green under conditions that 95 per cent. of ordinary candidates, consisting almost entirely of youths and young men, practically all of them wage-earners, and certainly not educated in color in the great majority of cases, never fail to recognize.

No man is rejected whose only error is that he cannot detect green in the two pale-green disks of Williams' lantern, this being his only error, and not repeated when he is shown their contrast to two whites.

Prior to the adoption of the modified lantern .42 per cent. with defective color-sense not detected by Holmgren's tests were discovered by the old lantern. The new lantern increased the percentage .7 per cent.

CONGENITAL COLOR BLINDNESS.

From *The British Medical Journal*, Aug. 20, 1910.

[Also published in *Australasian Medical Gazette*; also criticised in *Ophthalmology*, Seattle, United States.]

When the color sense from the standpoint of Holmgren's wools and William's lantern amounts to complete or nearly complete blindness to red and green, it influences and limits the expression of the face. If a color-blind person be intelligent and alert, the expression of face is an appeal to the observer for a cause.

My experience has been almost entirely with the wage-earners of the railway service, who, in many cases, may be described as leading grey lives. These men when entering the service are examined in batches of four. I nearly always detect a candidate who has a very defective color sense by his face. I also occasionally select a man as having a very defective color sense, and find that he can pass the two tests successfully. He belongs to a class who dull and unobservant, select the wools slowly and confuse blue with green: the color sense is normal, but the mind is indifferent to color. A color-blind person's face is devoid of warmth or humor; it is dull, still, and monotonous in the sameness of its expression. When a man blind to red and green is unintelligent his face suggests a mild degree of dementia which his conduct and conversation disprove. The voice of a green-blind in conversation is an unmusical monotone. The appreciation of music in the color blind appears to diminish as the color sense diminishes. The almost complete color blind generally admits to deriving no pleasure from music. A man, however, may be almost tone deaf and have normal color sense. I carefully examined two boys at the commencement of this year, healthy, unintelligent lads, and green-blind. In each case I had difficulty in eliciting a knee-jerk.

CONGENITAL COLOR BLINDNESS.

From *The Australasian Medical Gazette*, Feb. 20, 1911.

[Part of this was published in *The British Medical Journal*, December 7, 1910.]

A well-known authority on color blindness stated in a magazine published some months ago that he found more color blind persons among musicians than in any other class. This bald statement, unless corroborated by statistics compiled from the work of competent observers, is of little value. A percentage of criminals are ministers of religion, but whether a higher percentage than in any other class equally protected by education and environment is doubtful, and would require more than a man's statement to command serious attention.

The saying that the first impression of a face is usually reliable is explained by the critical state of mind in which a first impression is formed. A face can be correctly valued by an experienced and trained mind, and when an error is made it is due to a defect in experience, training, or mind. The simple-minded and imperfectly-educated may perhaps be more easily valued than the more complex. The latter is frequently a carefully manufactured article trained for a position without regard to any real fitness. Self-made success is generally due to merit. Education is occasionally an endeavor to conceal an inherited defect. A color blind man may appear to be a musician. He may be phenomenal where accuracy and dexterity without inspiration is required, but he must at his best be a black and white artist. It is impossible to conceive that Mozart was color blind, or that mind and education being equal, his music would appeal equally to a red-green blind and a lover of music with a normal color sense.

Since my appointment as Railway Medical Officer about 18,000 candidates have been examined in color sense, the great majority of them healthy and vigorous youths and young men. Four candidates are examined together. They enter the room in which they are to be tested in a mental condition common to the four. The examiner will note the expression of each face. Faces may be classified from a color-sense standard into three divisions: (1) the color blind; (2) normal color sense with the mind indifferent to color, and (3) normal color sense with mental appreciation of color. There is never any difficulty in classifying No. 3. The only difficulty will lie between No. 1 and No. 2. Select from the four the face most suggestive of class 3. Take him first in selecting the wools and direct the remaining three to watch. A dull face may

be an entirely mental condition and a distinction must be drawn by the trained observer between a face that is color blind and a face that is simply color indifferent. The color indifferent face is usually found associated with a dull and unobservant mind. The trained observer will generally be able to rapidly and accurately classify the three watching faces. There will rarely be more than one about whom he has any doubt. His mind must be absolutely critical, his conclusion based upon the value of the face alone. The fact that one face shows strength and intelligence and the other dullness and an ox-like eye indicates mind value, not color value. I have seen many intelligent color-blind faces, but never one blind to red and green with any humour in it or any play of expression; it is always a still face, devoid of warmth. The face of a deaf man may be a little suggestive of color blindness, but the expression is not the same. The voice of the red-green blind man has no appeal in it, and is devoid of inflection or ring.

THE EXPRESSION OF THE COLOR-BLIND.

[From *The British Medical Journal*, June 3, 1911.]

DR. GEORGE HENRY TAYLOR (Sydney) writes: I have now seen and conversed with seven educated and intelligent red or green blind persons (Holmgren's classification) not connected with the railway service. I found that each of them belonged to the type I have described in my former notes. As a red or green blind person (in my former notes I described these as red-green blinds) has something wanting in the expression of his face that is always present (although varying in degree in different persons) in a person who has normal color vision, the fact that a face is alert and intelligent may conceal this defect. In classifying a candidate's color sense after he has been examined by the wools and the lantern, it is the quality of an error made that determines the expert, not the number of errors. A trained and alert mind if blind to red and green may escape detection by a careless and inexperienced examiner. When the mind of a red or green blind person is untrained in color, detection is simple. In exceptional cases an equal degree of difficulty will exist even with a trained observer in classifying a face. With the ordinary candidate it is not difficult to recognize a red-green blind by his face value, under the conditions I have described in a former note. Many of the red or green blind persons I reject for work on the running lines are employed in the railway workshops. I occasionally see some of these men when they have been sick or injured. The type is obvious after it has once been recognized.

THE COLOR-SENSE IN RELATION TO THE EMOTIONS.

[From the *Australasian Medical Gazette*, July 6, 1912.]

In appraisement of the criminal type seen in my long association with Darlinghurst Gaol as Assistant Visiting Surgeon, I recognized two distinct intellectual classes, the one sombre and observant, the other bright and emotional. I also at that time recognized in school boys a type which was bright, joyous and emotionally restless, in contrast to a type in which, with an equally keen appreciation of its surroundings, there was a comparative absence of these conditions. This could not be explained by a difference either in intelligence or in the moral sense. I was unable at that period of my education to appreciate the cause. It is now four years and four months since I took up duty as the Railway Medical Officer of this State. I had, at that time, no experience in color testing, my only qualification being that I had a trained mind and had carefully read Holmgren's instructions for testing the color sense. I quickly discovered how nerve-racking an experience it is to examine a large number of persons by Holmgren's Woods, and I recognized, when examining by that method, that the mental condition of the candidate was then more in evidence than when he was examined by the lantern. Following the custom of my predecessor, I examined four candidates at a time. I instinctively selected as the first to test, the man with the brightest looking face of the four, with the hope that the remaining three might cause me less trouble when it came to their turn, since they would then understand what I wished them to do. At an early period, allowing for some mistakes, I generally placed a color-blind with the last two. I found, when conversing with the men afterwards, that the brightness of face was by no means an index of the mental quality. Occasionally a man who was a bad red-green blind looked alert and keen, and when such a person was contrasted with a man who had a normal color sense, it required judgment and experience to discriminate between the two. When I made a mistake, and I am still liable to mistakes, it was due to my giving false value to the intelligence. The voice was also of assistance. There was dullness in its tone in one class, as compared with the other. Many men who had a normal color sense had this dullness of tone nearly and sometimes quite to the degree noticed in a red-green blind, so that occasionally the voice did not assist, but the thrill, the warmth and appeal in the voice noticed in persons with a keen color sense was uniformly absent in the color-blind. In ordinary conversation, a color-blind person, if intelligent, frequently showed keen appreciation or resent-

ment, he laughed or frowned, but it always appeared to be an appraisal by the mind. There was never evidence of the warmth and joy to be detected in a person with a keen color sense. I have lived with red-green blind persons and have several intelligent friends who are red-green blind. I always noted and resented in them the absence of warmth and of joyousness. One was musical and artistic, but I resented a want of warmth and appeal in his singing voice as also in his playing, although I now recognize that I craved for something which might not be included in the expression of the musician's idea. I notice in singers that the color face is associated with sympathy and thrill, and this is the quality which to a large extent arouses enthusiasm in an audience. A merely intellectual rendering of a song, however beautiful the voice may be, is entirely lacking in this quality. I notice in one case the presence, and in another the absence of what I refer to, in Madame Dolores and Madame Melba.

One of the earliest recognitions by the mind is the appreciation of dark and light, and these persist in alternate evidence in the mind of the adult person who can see. When a child can speak, he will soon name correctly any dark or light object without color, but will call them black and white regardless of shade. His face, long before this, will show emotion to color, particularly to red, but the power in an ordinary intelligent child to name correctly red or green will come later than his power to name black and white. A child of six years, born and reared by parents who have a keen color sense, can easily pass Holmgren's test, an ordinary intelligent fletcher or laborer has difficulty in so doing. A person who has a weak color sense may in the modified Williams' lantern, name pale green—white, and pale red—white. He will not repeat the mistake in red after he is shown its contrast to white. With green he has more difficulty, but in many cases he may by education be able to name the colors in the lantern correctly. On the other hand, even with this aid, a percentage of persons fail to do so. Here it is not the intelligence that is affected. As under no condition can he ever be induced to call green—red, or red—green, I infer that in a limited number of persons the mind itself resents anything that is not the primary appeal. A little more defect is when the mind names certain shades of red—green, or green—red. A man who does this may call two bright reds or two bright greens—white. A still greater degree of color defect is when a full bright red and a full bright green are shown in contrast, and are named as one color. A small percentage of color-blind persons when ex-

amined by the wools, select in matching a green wool, in addition to the ordinary confusion colors, bright red and pink, but I have never known a color-blind person to name a full bright red and a full bright green whilst contrasted in the lantern, as two whites.

This is the final condition in which the emotional characteristics I have described may be expected to disappear.

In answer to my letter in *British Medical Journal* dated 24th December, 1910.

THE EXPRESSION OF THE COLOR-BLIND.

SIR—I cannot agree with Dr. Taylor that the color-blind have any characteristic expression. As will be seen from the cases I have recorded, color-blindness is very frequently associated with exceptional intelligence and ability. No one could for a single instant apply the description which Dr. Taylor has given to any of these men. I note, however, that he still uses the Holmgren test, and as most of the color-blind men to whom I have alluded can pass this test with ease, he is hardly in a position to judge of the expression of similar cases. I am, etc.

F. W. EDRIDGE-GREEN.

London, N. W., Dec. 23d.

The receipt of this was acknowledged by *British Medical Journal*, but not published.

THE EXPRESSION OF THE COLOR-BLIND.

8th February, 1911.

The Editor,

British Medical Journal.

SIR—With reference to the letter signed F. W. Edridge-Green in your journal of 30th December last; I did not anticipate that gentleman would agree with my opinion regarding the facial expression of the complete or nearly complete red-green blind. I did anticipate that the person who read my three notes published in your journal would be judicial when commenting upon them. In my first note written in February last year and published in your journal on 18th June, I reported that after examining 12,000 candidates in color vision I found 1.12 per cent. of color-blinds were undetected by Holmgren's wools. Can Dr. Green contrast this with any statistics of his own? I also mentioned that with the old Williams' lantern there was still a risk of dangerous color-blinds being admitted into the service. The modified lantern replaced the old lantern by my advice a few months after my appointment as Railway Medical Officer. I also mentioned that from an early date when in doubt I used the Nagel test. I have used

for many months Dr. Green's new lantern. I have carefully read the description of it. The only edition of his book I have now is the one published in 1891. I have examined several hundred cases, including a large number of color-blinds, by Dr. Green's lantern and the modified Williams' lantern together. In my opinion the modified Williams' lantern is more suitable for railway work. It is simpler, can be used more quickly, and its findings impress an observer more strongly than Dr. Green's. From the standard of accuracy the one lantern practically confirms the other. My experience, as I have already stated in one of my published notes, has been almost entirely among the wage earners of the Railway Service. I have practically no experience of the highly educated and intelligent type Dr. Green is conversant with, but I have no doubt that color sense has no relation to intelligence, and I have never suggested that it had. A daylight test is necessary to safeguard the running lines. The lantern is not enough. Exceptional cases of color-blindness of a dangerous kind I have detected by the Holmgren method and confirmed by the Nagel method that have passed both Dr. Williams' lantern and Dr. Green's lantern without mistake. I know of no improvement on Professor Holmgren's method as a daylight test. I have examined 18,000 candidates by it, consisting of Porters, Fitters, Juniors, Cleaners, etc., many of whom came from the back country, and 96.2 per cent. struggled through it without picking "confusion" colors. It was a nerve racking experience and I would gladly accept a more accurate and less trying one.

Dr. Edridge-Green on page 281 of the first edition of his book "*Color-Blindness and Color-Perception*," regarding the examination of a candidate by his own wools, states, "The examiner should not go through the test before a candidate first of all, neither should a candidate be allowed to watch another make his selection. A shrewd color-blind person might pass the test if he had seen a normal sighted person go through it previously." Does Dr. Green suggest that this method should replace Professor Holmgren's method?

In regard to the facial expression of the complete or nearly complete red-green blind, it is possible that the highly educated and intelligent type Dr. Green refers to is more difficult to detect than the type I refer to. The class I deal with visit in thousands the large English hospitals. What I can see and demonstrate to intelligent and trained minds in this city, other observers can see. My description of the facial expression in the complete or nearly com-

plete red-green blind clarified and matured by the criticism of many minds will in time be generally accepted.

From *The British Medical Journal*, August 19, 1911.

COLOR-BLINDNESS.

SIR—In reply to Dr. Edridge-Green, in common with every experienced color tester, I appreciate the effect of shortening of the violet end of the spectrum in a candidate. No competent person would reject a candidate for employment on the running lines of a railway service for such a cause. I have read most of the books dealing with the subject of color-blindness, including one written by Dr. Edridge-Green. As an example of what I referred to in a former note, I quote the following case:

A. J., aged 30, fettler, intelligent and healthy, had watched three persons with normal color-sense examined by Holmgren's wools, found to be a well-marked green-blind (Holmgren's classification). By the lantern his only failure was to name the pale green-white.

I mention this case, as although he did fail, he failed in a degree which experience shows may not be confirmed in a subsequent examination. He was re-examined by one of our leading ophthalmic surgeons, when he repeated only the same mistakes. The difference between Dr. Edridge-Green and myself is one of clinical evidence, and further discussion will, I think, be useless.

To revert to the expression of a color-blind person, a candidate with a normal color sense is frequently nervous when undergoing examination, and his hand may shake when selecting the wools. In this he is in marked contrast to the ordinary red-green blind.

I again emphasize the fact that my experience has been almost entirely amongst the wage earners of this service, and that I have now tested in the past three and a half years 20,000 persons by Holmgren's wools and Williams's lantern, and also many hundreds of cases by Dr. Edridge-Green's lantern, probably not less than 2,000. I am, etc.,

COLOR-BLINDNESS.

From *The British Medical Journal*, Sept. 2, 1911.

SIR—In his letter of August 19th, Dr. G. H. Taylor uses the term green-blindness, and of all the cases which I have examined I have not met with a single one which would correspond to the definition which was given of green-blindness in the older textbooks. This is well recognized on the Continent, and the term has been generally discarded. The unsatisfactory nature of this term is seen when one and the same case is designated as green blindness by one authority and red-blindness by another. All dichromics have a neutral point, and confuse certain shades of green with grey,

No man who calls the green of my lantern white can be considered to have passed the test. If Dr. Taylor will refer to page 110 in my book on color-blindness in the International Scientific Series, he will find that I have described an expression which I have found in certain of the color-blind. I find this is particularly noticeable in men who know that they are color-blind, and I have, when testing a number, picked out a man on this account and told him that he knew that he was color-blind, and he has admitted that such was the case. Nervousness is particularly likely to show itself in a defective organ. If Dr. Taylor should come to London I would be very pleased to take him to a meeting where I know several color-blind persons will be present. Personally, I do not think that any one could pick them out from their expression, but Dr. Taylor will then have an opportunity of ascertaining whether he can do so.

I am, etc.,

F. W. EDRIDGE-GREEN.

London, N. W., Aug. 23d.

Acknowledged by the Editor of *British Medical Journal*, but not published.

In reply to Dr. Edridge-Green, the case mentioned in my letter published in your journal on 19th August was examined by Holmgren's Wools, and I therefore adopted Holmgren's classification. I am aware that when examined by the lantern, no distinction can frequently be made between a man who is a red-blind, and another who is a green-blind by Holmgren's Wools, excepting that Holmgren's green-blind is more often convicted of calling green red, than is a red-blind. The case I mentioned was a green-blind by Holmgren's Wools, and his only mistake was to name the pale green—white, when examined by the lantern, therefore the finding of the lantern did not convict him of red-green blindness.

In page 110 of Dr. Green's book to which he refers, I read, "In many color-blind persons a curious appearance of the eyes may be observed. In most persons the lower lid covers the edge of the iris, but in many color-blind persons the lower lid does not extend as far upwards as the iris. This gives a very odd and unnatural appearance to the eyes. I mention this because it has enabled me to detect several color-blind persons."

Following this is—Wilson speaks of a peculiarity of the eyes in certain of the color-blind. He says, "One has an absent, anxious glance, with something of the expression which amaurosis gives, only the pupil is small. One has a startled, restless look. The other two have an eager, prying, aimless air. The character common

to them all, and to the other cases I have seen, is this aimlessness of look." I infer from this that Dr. Edridge-Green and Wilson may have had at least a vague and confused impression of what I call the color-blind face. They both fail in my opinion to recognize it or give to it any real significance. Dr. Green states in his letter in referring me to the above (presumably the aimlessness of look), "I find this is particularly noticeable in men who know that they are color-blind, and I have, when testing a number, picked out a man on this account and told him that he knew he was color-blind, and he has admitted that such was the case." What particular relation this statement has to the statement in his book "In most persons the lower lid covers the edge of the iris" etc., I cannot determine. Candidates are first examined in my office in the Wools, then by the modified Williams' Lantern, and afterwards in form vision by Snellen's Type. About 18 per cent. fail in form vision. I finally examine each man physically in a naked condition. Dr. Green states "Nervousness is particularly likely to show itself in a defective organ." The statement in my letter was "A candidate with a normal color sense is frequently nervous when undergoing examination, and his hand may shake when selecting the wools. In this he is in marked contrast to the ordinary red-green blind." Dr. Edridge-Green evidently does not appreciate my meaning. It is the red-green blind who is not nervous, whose hand does not shake, and who when I examine him naked, does not exhibit any unusual alteration in his pulse beat, or in the impulse of his heart beat.

The following in addition to what I have already stated in former notes is my opinion.

(1) That the expression of face of a violet-blind is much nearer to the red-green blind face, than to the color appreciative face, although it will be confused with the color indifferent face.

(2) Particularly in the young, before the mind has clearly recognized the responsibilities of life, a red-green blind person can be easily distinguished from a person with a keen color sense. The latter is highly receptive of transient emotional appeals. A lilt or a tear in his voice is readily induced by emotion.

(3) That the voice and face of a red-green blind person is not entirely accounted for by the non-recognition of color, that the absence of a color sense appears to diminish the appeal of other emotions.

I thank you sincerely for the publicity you have given to the opinions of an unknown person in your valuable journal, and I will

in future make no further trespass on your space. I am a Government servant and also past youth. It is therefore improbable that I shall ever again visit London.

I thank Dr. Edridge-Green for his valuable lantern which should be an assistance to color testing, but what I have written about the color-blind face and voice, I leave to the judgment of other observers.

THE COLOR-SENSE IN RELATION TO THE EMOTIONS.

Take four skeins of wool, one purple, one green, one red, and one yellow, each with an equal degree of color saturation, cut them into lengths and arrange the lengths in the form of Holmgren's Wools, then mix them in a heap and place in front of a candidate a sample from each skein. Direct him to place with each sample, wools of the same color as the sample taken from the heap until it is exhausted. I have never known a color-blind person to fail in this test, even a person who has practically no sense of color. This was once a wool test for drivers and firemen in a railway service.

The modified Williams' Lantern allows an Examiner to bring rapidly into view any color from the discs in the lantern. A type of color-blind person when a pale luminous red and a dark red are in contrast will name the pale red—white and the dark red correctly. Rapidly replace the dark red by a bright white or a green light and he will promptly name the bright red correctly. With two greens in contrast, one brighter than the other, he will name the bright green—white and the less bright green correctly. Rapidly replace the darker green by a bright white, and he will name them correctly. When an ordinary red-blind person has completed his selection of Holmgren's Wools in the green test, request him to review his selection, and he will frequently reject a number of the confusion wools he has picked, and occasionally reject them all. In matching a pink wool, select from the wools he has already picked a blue wool, and he will frequently name it and the sample wool correctly. A color-blind person, if the mind acts upon the evidence of an appeal, will always name correctly a bright white light. On the other hand if his mind is conscious of a defect he may name a dull white—green, particularly when it is in contrast to a bright white light. Color-blind persons differ in their ability to name correctly color by shade, but when a shade can be perceived, the mind with education may refer it with a degree of accuracy to a certain color, so that whilst a color-blind person may be unable to name correctly a bright colored light at a distance, he may be able when the light is near. The paler the color and the brighter

the light, the more prone a color-blind person is to see it as a white light when it is near. The ability or failure of a color-blind person to name color correctly by shade is not due entirely to an effort of intelligence. The mind of a limited number of persons instinctively resents any departure from the immediate evidence of an appeal. A medical man whom I have known for many years in this city, called at my office some weeks ago. He informed me that for years he had been conscious that his color sense was not quite normal, but only recently did he know that he was occasionally uncertain in distinguishing red from green. A tram he had to catch every night in the city had in front of it two lights, a green and a white. On two occasions he saw a tram approaching in the distance, and looking at the lights considered they were green and white. He did not look again, and when the tram stopped he entered, to discover shortly afterwards that he was being taken in a wrong direction. This tram really showed a red and white light. He found that by waiting until the tram came near to him he could distinguish between the red and the green.

Examined by Williams' Lantern he failed occasionally in the pale green, naming it white. He failed in a similar way with Dr. Edridge-Green's lantern. It was evident on more than one occasion that he was in doubt in regard to red lights in the Williams' Lantern when they were in contrast. On one occasion he said, "I think those are red lights." Examined by Holmgren's Wools it was apparent at once that his mind was confused. He looked at the sample wool and from it to the heap of wools: he picked up several confusion wools and dropped them, ultimately selecting four green wools, none of them pure green. With the pink test he was still more hopeless, turning the wools over and over, but refusing to pick.

It was necessary for an observer to form his judgment of the appeal of the special senses from a critical experience of a large number of minds. A person with a defect in one or more of his special senses may by this method of the observer be able to correctly record the effect of an appeal upon the mind of other persons. Schopenhauer did not adopt this method when he wrote, "Let me speak plainly. However close the bond of friendship, love, marriage, a man ultimately looks to himself, to his own welfare alone, at most to his child's too."

With the moral sense, the color sense, and the sense of musical sounds, there is I think, an analogous condition of appeal by each sense to the mind. An appeal by one sense may involve other

senses. Each sense ranges from complete want of recognition by the mind to the keenest appreciation. The extremes in each sense are very rare. It is therefore necessary that an observer should have a wide experience of the appeal, not only of one sense but of all these senses. The mind in its court of special senses and nerve centers appears by education to specialize its most efficient servant. In practical work, however, it may fail because of the involvement of other centers. A person may have a keen color sense with an educated and highly intelligent mind, and yet may be not successful as an artist because of a deficiency in other centers of his brain.

The voice of a red-green blind person is a mind voice and therefore wanting in emotional appeal. It varies with the quality of thought, but is monotonous in tone and retains its monotony of tone under conditions which would cause a lilt or a tear in the voice of a person with a keen color sense. As the quality of mind varies in different persons from an animal type to the master mind, so the manifestations of emotion between these two types will vary.

The blindness of the mind to the appeal of a special sense has an influence upon the other senses. A red-green blind person with a keen sense of musical sounds would still be devoid of warmth and humor, that subtle sense of sympathy and appeal which is frequently the chief charm of a singer or pianoforte player would be wanting. A person with a keen moral sense would fail for a similar cause in his influence upon the minds of other persons.

A. G., aged 16, with a very intelligent and alert mind, examined by the wools and lantern had practically no sense of color. As his was a rare case, my examination was somewhat prolonged. His face throughout was still, devoid of emotion, and highly critical. When I had finished with him, he asked me with a degree of resentment whether all that I had done was really necessary for the admission of a junior into the Railway Service.

An ordinary emotion is transient, when it persists it involves the mind. Possibly a highly intellectual color-blind person may be more useful as a citizen than a highly intellectual person with a keen color sense. The special senses may be purely phenomena which serve a purpose during a period of intellectual development to be replaced in a future race by a condition of mind which is independent of their appeal. The poets, Shelley and Burns, are an instance, in the latter case of the strong appeal of sex and color, and in the former case of their comparative absence. Shelley with his intellectual and artistic mind, highly educated, not poor, with a keen sense of form and shade and of the melody of words, has

the same tone more or less throughout all his published thoughts, a minimum of humor, a minimum of warmth. Burns, an uneducated peasant, with a phenomenally keen mind, his poems are saturated with humor and warmth and the appeal of sex.

THE COLOR AND MORAL SENSE: AN ANALOGY.

The degree of color or moral sense in a healthy individual is congenital and can only be diminished by disease. They vary from complete blindness to the highest development. The extremes are very rare. The condition of one sense is no evidence of the condition of the other. A mind may be acute or dull. Education and environment are necessary to give a mind an intelligent appreciation of either sense. A marked defect in either sense gives a characteristic expression to a face, obvious when the extremes are in contrast. In many persons there is an apparent indifference in the mind to an appeal, in one of the moral sense, in another of the color sense. The indifference in the mind to the appeal of either the moral or color sense is betrayed to the observer not only by the face but also by the voice. This indifference in the mind is caused, not by a defect in a special sense, but to a deficiency in the sensitiveness of the mind. A different environment and education of such senses extending through a continuous series of lives, causes increasing indifference in one series of units, and an increasing response in another series, occasionally producing an unstable condition in which the mind of a unit becomes the servant of a sense. A color-blind person can, by education, name color with a degree of accuracy by shade or brightness, but can do this only under favorable conditions of light. A moral blind person can by education recognize moral sense by something analogous to the color-blind's sense of shade or brightness. It will be equally unreliable if the appeal to mind is unusual. A red-blind engine driver is obviously a dangerous man in that position, yet red-blind engine drivers have been known to drive trains on the running lines for years without causing disaster. (1) To avoid or at least diminish the risk of disaster the mind of a red-blind engine driver must be alert and intelligent; (2) his fireman, if observant and with a normal color sense, will in time recognize the uncertainty of his driver to signal lights under certain conditions, and safeguard him. An intelligent moral blind person with a favorable environment may appear to be controlled by a normal moral sense on the running lines of life, (2) a high type of wife or intimate friend would recognize his defect and endeavor to safeguard him. (1) To avoid or at least diminish the risk of detection, the mind of a moral blind

person must be alert and intelligent. It is probable that few persons are qualified to criticise the color productions of a master amongst artists, and intelligent criticism may vary according to the degree of color sense in the critic. This is equally true in questions involving moral sense. To the appeal of color, the mind of a complete color-blind person perceives only shade or brightness. To the appeal of moral sense, the mind of a complete moral blind person perceives only shade or brightness.

CONGENITAL COLOR-BLINDNESS.

From the *Australasian Medical Gazette*.

Where the appeal of the special senses is concerned it is necessary for a trained mind to form its judgment from a critical experience of a large number of minds. By this method an intelligence, with a defect in one or more of its special senses, may be able to correctly record the effect of an appeal upon the mind of other persons. An intelligent moral blind person may perceive this effect and use it for gain. A sanctimonious criminal is not uncommon. One of the leading authorities upon the subject of color blindness is himself blind to color (Professor Nagel). A person may have a keen condition of his special senses and be highly educated, his criticism of the work done by others may be sound, and yet he may be unable to acquire the dexterity necessary to interpret the music of a master or to excel as a painter. The center in his brain which deals with the movements of the hand, and the center which is concerned in the appreciation of form may transmit a deficient appeal to the mind. One of the earliest sensations of a new-born child is a perception of light and dark—of black and white. These conditions remain in alternate evidence during the life of a person who can see. It, therefore, under ordinary conditions does not make any special appeal to the mind. It is different with color. The face of a young child shows emotion to color, particularly to red, and red remains the color with the strongest appeal to a great majority of men. It excites to a greater degree than green, because of its comparative rarity and because of its association with human life and health. It causes an emotion of pleasure in the mind of a person with a keen color sense when it is perceived in contrast to green in the form of a flower. With barren and grey surroundings, a person with a keen color sense exhibits emotion when he perceives green. A red-green blind participates in none of these emotions. With an equally intelligent mind he has merely the appeal of black and white and the varying degree of shade which bridges the one from the other.

THE COLOR-SENSE IN RELATION TO THE EMOTIONS.

From *The Lancet*, March 9, 1912.To the Editor of *The Lancet*.

Sir,—The effect upon the pulse-beat of a slight emotion may be illustrated from the examination of a candidate for admission to the railway service of New South Wales. The degree of emotion varies with the type of applicant. In one man there is great anxiety to obtain a position, in another comparative indifference to the result. One man is stable, another is neurotic. The degree of appeal in a railway fettler under examination for permanent employment in the railway service varies less than in any other class. This man belongs to a rapidly disappearing class, a large majority of whom were born and reared in the country districts by poor, hard-working parents. They are as a rule big, muscular, healthy men of stable type in many ways childlike, and more than usually honest. A neurotic railway fettler is rare. A casual observer would regard him as being mentally dull, but a true valuation is that within its limited orbit of observation and experience the mind is sound in judgment.

The appeal to a color-blind fettler is direct to the mind, his face shows no indication of emotional response. This is very marked during his selection of the wools. When spoken to his voice is monotonous in tone, and still more so when attempting to name the colors in the lantern, when he frequently hesitates and pauses before answering. On the other hand, a fettler with a good color sense never hesitates or pauses when he is naming the colors in the lantern; in his case there is no evidence that he requires assistance from the mind. During the examination by the wools the fettler with a normal color sense frequently shows a slight degree of excitement, his hand may shake, and when examined physically there is frequently an increase in his pulse beat. This condition is transient and may disappear before the examination is finished. When the mind of a fettler realizes that he has a defect which unfits him for the service he looks depressed, but if he is a color-blind person there has been none of the preliminary excitement frequently seen in a person with a good color sense. Under these conditions the depression appears to persist longer in a color-blind person than in one with a keen color sense, and to be more sombre and uniform in its mood.

One type of candidate drawn generally from the city is not satisfactory to deal with from the standard of emotional appeals. A number are neurotic, a class I endeavor to exclude from the run-

ning lines of the railway service. A dilated pupil, tremulous hand, rapid pulse, etc., frequently indicate the habits of a degenerate. A mind with experience will endeavor to exclude such persons.

THE COLOR-SENSE IN RELATION TO THE EMOTION OF SEX.

From the *Aust. Medical Gazette*, dated 24th August, 1912.

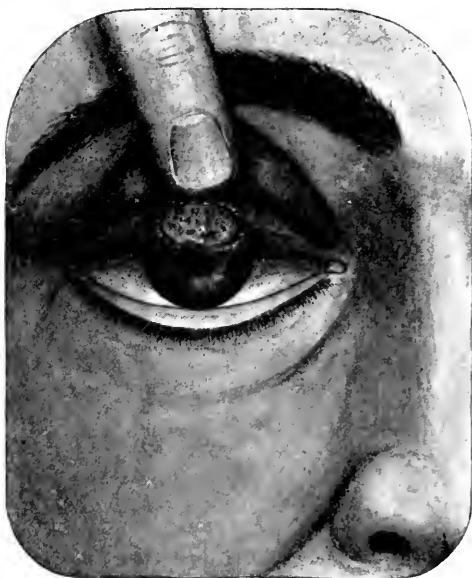
At a period in the evolution of the world, which may be regarded as itself a part of that evolution, there appeared the phenomenon which we describe as life. Whether a certain condition of matter, immediately prior to this phenomenon is to be regarded as female, and whether light, heat or some unknown force is to be regarded as the sperm, or *vice versa*, is unknown. Whether it came into being upon the surface of the earth, in water, air born, or under the earth is also unknown. However, this we do know, that in its earliest known manifestations there are always present two conditions, one which is concerned in its nourishment and another which impels it to multiply. From these fundamental emotions all the appeals which now serve the human mind have sprung. The appeal for the sustenance of the unit and the appeal of sex remain as the dominant emotions of the highest living organisms of today. The emotion of sex is closely related to the emotions of color, conduct, and musical sounds. It is to me obvious that the appeal of red cannot give a stimulus to the mind of a sexless person equal to that given by it to a healthy virile man or woman. The play of musical sounds on the emotions frequently includes the appeal of color, and still more frequently the appeal of sex. The latter is the music that makes the greater appeal to the ordinary man and woman.

It is interesting to note the opinion of the highly educated and artistic Ruskin at his first hearing of Wagner's Tannhauser. To him it conveyed no meaning and was distinctly unpleasant. Ruskin was asexual. The mind in the highly endowed and virile unit appears to pass in intellectual progression through distinct phases of color. In normal youth, when sex is most assertive, red is the dominant color influence, in middle life red loses its intensity, till in a healthy and normal old age, the appeal of bright red is practically eliminated, and may be replaced by suggestions of blue. The romance of sex is expressed in its most emotional form in music and color. Pure intelligence is asexual. On the other hand, social life is rendered more attractive by an educated color sense. The throb of sex expressed in music appears to be now more attractive to the educated and idle unit than the bearing of and rearing of children. In modern days when the highly educated privileged class approximates this asexual point of pure intelligence, the sug-

gestion of sex in music and in color appears to afford almost a sufficient gratification of the sexual emotion. It undoubtedly has a keen fascination for a number of persons. It unfortunately is associated with crowded halls, with late hours, with an absence of sunlight, with a type who do no useful work, and with a want of virility.

THE COLOR TESTER.

If a slight flaw is detected upon the running lines a collapse in which might cause disaster, the experienced railway mind would not be excused in the event of disaster by pleading that the flaw was so slight that it did not imperil safety.



1—Palpebral Syphilis (Alter).



2—Palpebral Syphilis (Alter).



3—Palpebral Syphilis (Alter).

PALPEBRAL SYPHILIS, A REVIEW WITH CASE REPORT.

DR. FRANCIS W. ALTER.

TOLEDO, OHIO.

The participation of the eyelids in a syphilitic process, relatively speaking, is rather a rare event. In an article entitled "Syphilis in the Innocent," by L. Duncan Bulkley¹, of New York, he states that 25% of all cases of lues are extragenital, and of this 4% were on the eyelids. They were placed by him as ranking 5th in order of location for extragenital primary infection.

A very comprehensive review on the frequency of palpebral primary involvement is given by C. E. Finlay² in an article entitled "Double Chancre of the Eyelid." He says in part: "In literature at my disposal I have found reports of about 100 cases, and from different writers the total summing up of cases seems to be in the neighborhood of 500." He also gives the following quotations relative to the statistics on the subject:

"Willbrand and Staelin in 16,615 cases of syphilis in 307 of which the primary sore was extragenital, do not mention a single case of chancre of the eyelid. Peppmuller finds the proportion of chancre of the eyelid as 4 to 5% of other extragenital chancres. Lesser in 201 cases of chancre found 16 extragenital, one of these being situated in the eyelid. Talbot found 3 cases of chancre of the eyelid in 434 cases of syphilis. Neumann found in literature 162 cases of lid chancre among 613 extragenital ones, having personally observed 2 in 86. Prosek found 2 cases of ocular chancre, one on the lower eyelid, in 469 cases of extragenital chancre. Nivet, quoted by Mohr in 595 cases of extragenital chancre found 413 in the head and 15 in the lids. Fortuniades compiled 118 cases from literature. Ziessel found 8 cases of lid trouble in 40,000 cases of syphilis. Alexander found 247 cases of chancre of the lid in 931 extragenital cases. Munchheimer places it in the seventh place among extragenital chancres, after the lips, breast, mouth, finger, hands and tonsils. As a rule it is however, granted the third place after the lips and finger (Knies, Michel, Gruder). Porey Koschnitz in 852 cases of extragenital chancres found 132 in the eyes, most frequent after the lips. Tepljachin and Pospelow found from 15 to 25% of the population of two Russian villages thus affected."

From the foregoing it is apparent that syphilis of the eyelids, although relatively unusual, is encountered frequently enough to enlist our very earnest attention.

Palpebral syphilis may be said to be one of the many and varied

expressions of this omnipresent affection with its manifold and protean characteristics, and it is because of its importance and at times veiled character making the diagnosis difficult, that we offer this resume and case report before this academy. Its clinical behavior in its differential aspects is oft times puzzling and without a doubt in many instances the failure to make a correct interpretation is not unusual.

One should look with suspicion on a lesion of the eyelid having somewhat the appearance of a hordeolum with some of the corollary characteristics of a chalazion. We may find added to this more or less inflammatory oedema with a nibbled punched out area at the lid margin, and an absence of cilia in the affected region. Another factor which is especially constant; the lesion will be characterized by a marked degree of indolence and chronicity. There will also be an enlargement of the preauricular or submaxillary glands. The diagnosis in such a case should be established or disproved by a search for the *spirocheta pallida*, supplemented by a Wassermann reaction. If it is a primary lesion our clinical diagnosis is much strengthened by being able to demonstrate the existence of an indurated base to the ulcer.

It has been said and with no little force that our success as oculists at times is in direct ratio to our qualifications as syphilographers, and in this I think you will bear me out.

With the discovery of the *spirocheta pallida*, the Wassermann reaction, and the introduction of salvarsan, which followed in its wake, we have been given the means of clearing up doubtful cases and thus a strengthening and fortifying effect has been added to our diagnostic and therapeutic resourcefulness which can scarcely be over estimated.

Palpebral syphilis, as already mentioned, in any one of the three stages is not common. In the first stage the chances of the lid becoming affected is very small.

The most common source of a primary lesion is through kissing or the practice of attempting to extract a foreign body from the eye by means of the tongue. "However the modes of infection are as various as the possibilities for placing the spirochete in contact with the eyes."³

"Several cases have been in physicians and midwives who have conveyed the poison by means of fingers to their eyelids. Two instances are recorded where physicians received the infection from patients coughing into their face."³

"Bulkley cites the case of a female practitioner in a Russian town in 1886 who caused an epidemic of lid and conjunctival

chancres in her efforts to remove foreign bodies from the eyes and to cure trachoma. She was the cause of 68 cases of syphilis at the time of this epidemic and 34 cases of direct infection resulted from this lady's efforts."³

The primary lesion seldom develops on the outer skin but is almost invariably intermarginal or in the canthi or upon the conjunctiva tarsi. This is due to the fact that the cutis of the lid is not especially permeable, but the delicate textures of the canthi where the dermis changes to mucosa, and where the glands of the conjunctiva and the meibomian glands exude their contents, offer easy inoculation of the virus.

The preauricular and other glands are often so swollen that a diagnosis of mumps might be easily made.

The chancre develops as elsewhere and needs no special description other than to say that it takes on the same traditional characteristics as elsewhere, to-wit, ulceration, induration and adenopathy. Its principal means of differentiation from similar morbid conditions, such as vaccine pustule, lupus, tuberculosis, hordeolum chalazion, and gumma, is in the indolent nature and frequently marked swelling of the neighboring lymphatic glands.

In looking up the literature on the subject, I have been impressed with the fact that the diagnosis of syphilitic chancre of the palpebrum is not always so simple.

Mahon *pon y* Marques⁴ reports a case where there was considerable difficulty in the diagnosis of chancre from tuberculosis, especially on account of the lymphatic involvement. In his case he inoculated a rabbit's eye with some of the exudate, however, it proved negative for tuberculosis. Antisyphilitic methods were followed by a rapid retrogression of the ocular symptoms and manifestations.

In connection with this method of diagnosis we might add parenthetically, that a search for the spirochete and a Wasserman reaction might have been an additional aid in arriving at a diagnosis.

Cauvin⁵ relates a case of hard chancre of the lid in a child of 10 months. No source of infection could be found. The parents were free from luetic taint as was also the nurse. Under treatment it rapidly disappeared leaving only a small area devoid of cilia to mark its previous location.

Pannunzio⁶ reports a case of primary infection of the fornix of the upper lid in a girl of 15. The diagnosis was verified by smears and on prompt antisyphilitic measures the ulcer cleared up.

In the minutes of the College of Surgeons of Philadelphia, I find

that Dr. Wm. T. Shoemaker⁷ showed a case of chancre of the eyelid and called attention to the difficulty of diagnosis. The patient was a woman, 30 years old and the source of infection was probably her husband. The lesion first showed itself at the inner angle of the right eye on the upper lid. It looked exactly like a hordeolum. It later spread to the lower lid and involved the entire inner angle. The submaxillary and preauricular glands were considerably swollen. One interesting feature of this case is that the patient avers that she noticed the swelling of the preauricular gland before she noticed the trouble in her eye.

de Schweinitz⁸ at the same meeting also reported a case of chancre of the lid which he followed for a period of some twelve years. The original lesion disappeared after six months treatment, but the entire upper half of the cornea showed a typical pannus almost like pannus trachomatosa. The corneal epithelium was hazy and blood vessels were present in great numbers. The vessels strange to say did not appear below the pupillary area. Pannus increased for one month and gradually subsided. The cornea never cleared up normally but the vision increased from 6/60 to 6/12 with glasses. At the end of twelve years the cornea shows only a few chalky deposits and a few irregular opacities.

de Schweinitz referred to the well known fact that in a certain number of instances a keratitis in acquired syphilis in all particulars resembling a true parenchymatous or interstitial keratitis has followed lid or conjunctival chancres. This occasionally as mentioned above may be a true pannus resembling in all respects a pannus such as is met with in "granular lids," depending as it does on the formation of blood vessels between Bowman's membrane and the corneal epithelium, and to which the pannus found following chancre of the lid conforms in all respects.

While the lesion on the lid may clear up satisfactorily an involvement of the cornea following in the course of a primary lesion of the palpebrum would make the prognosis for the affected eye quite grave. This is shown in the case reported by de Schweinitz above, and also in the following case report by C. A. Clapp⁹:

"Patient presented a painful indurated mass near the inner angle of the upper lid, over which the skin was freely movable. The conjunctiva was thickened over the tumor. Incision and curettage brought away only broken down cellular tissue. Later there appeared an ulcer at the limbus underlying the tumor of the lid. This gradually involved the cornea. As Wassermann reaction was positive and the patient responded to antisypilitic treatment, believes it to be a gumma."

Admittedly chancre of the eyelid is unusual, but C. E. Finlay¹⁰ reports a case of double chancre of the eyelid, which indeed is exceedingly rare. The patient worked in a tobacco factory with several hundred other workers. In common with the 200 other employes she used the common wash bowl and roller towel. This was the possible source of infection. The patient had some irritation in the eye and used this bowl and water for the purpose of bathing the eye. Some time afterwards she developed two chancres on the eyelid, one near the outer canthus and the other near the caruncle. This diagnosis was confirmed by a positive Wassermann and the demonstration of the *Spirocheta Pallida*.

Finlay goes on to say: "Among the clinical features of the case one of the most interesting is the double lesion, at the inner canthus and outer commissure. In literature I have found eight other cases of double chancre and one of triple chancre.

"The lymphatics of the eyelid drain to two principal nodes. Those of the outer two-thirds of the lids drain to the preauricular node and those of the inner third drain to the submaxillary nodes.

"Poitoux has called attention to the fact that chancre of the outer third is characterized by an enlargement of the preauricular gland, while chancres of the inner third cause submaxillary enlargement.

Antonelli¹¹ reports the case of a workingman who washed his eye, which had been injured, with water from the glass of a fellow workman. As the irritation increased, he consulted Antonelli six weeks later, who found edema of the lid with small excoriations, true tarsitis, marked chemosis with injection, swelling of the plica semilunaris, but no ulcer was present. An induration of the external commissure could be felt, with painful swelling of the preauricular and a greatly enlarged submaxillary gland. Morax, who examined the case in the laboratory, found syphilitic changes in the lid, but no other carriers of the infection were discoverable. Wassermann and Landau's reaction were strongly positive. A noteworthy circumstance was the absence of the typical primary lesion.

Secondary stage manifestations in the lid.

The skin of the lids enter into the skin eruptions in the secondary stage very little or not at all.

Mucous patches of the conjunctiva on account of their sometimes having a membranous appearance are apt to be wrongly diagnosed as "Membranous Conjunctivitis"¹². The conjunctiva very rarely may be the seat of mucous patches. However, recently

Hanford McKee reported such a case in which he was able to demonstrate the *Spirocheta Pallida*¹².

The history of the case was as follows:

Patient, aged 25 years, admitted to the hospital on account of a swelling on her right lower lid. Patient was very emaciated, had a cough and was the subject of syphilis. She had a scar on her vulva, a rash had been present, but had now almost entirely disappeared. Glandular involvement marked. Her mouth was a mass of mucous patches.

The patient did not complain of any pain or unpleasantness about the eye, but it had been noticed to be slightly swollen one day previously. The eye was watery and the conjunctiva congested.

Upon pulling down the lower lid there was noticed upon the palpebral conjunctiva in its outer part, that there was an area of quite a different color from the rest of the conjunctiva. The peculiar blue hue contrasted so plainly with the reddened conjunctiva that the whole border of the patch was very definitely shown. Somewhat oblong in shape, it extended from the middle fourth to the outer canthus, and from the edge of the lid to the fornix. The diagnosis clinically was a mucous patch on the conjunctiva.

The diagnosis was fully confirmed from microscopic demonstration of the *Spirocheta Pallida* from the scrapings of the patch. Patient put on anti-syphilitic treatment, no local remedies being applied to the conjunctiva, and the case got well rapidly and cleared up completely.

In the secondary stage syphilitic fissure of the external canthus may occur. Rupia have also been described involving the lids. In tertiary syphilis it has been well said¹³ that the only way to avoid errors is "eternal vigilance." One or both eyelids in one or both eyes may be attacked. The most common form of palpebral tertiary involvement is tarsitis.

Without pain the lid becomes slowly and gradually hypertrophied and the integument tightly stretched and hyperaemic. On palpation, which gives no pain, the tarsus can be felt to be enlarged and of cartilaginous density. Ptosis is often well marked and the eyelashes fall out.

Under treatment the infiltration disappears and leaves a normal eyelid behind, or the tarsus may be somewhat atrophied as a result of the inflammatory process. The oedema, and redness of the skin of the eyelid, resemble very closely the symptoms found asso-

ciated with a chalazion or hordeolum. Unless the oedema is recognized as a valuable symptom found in association with a specific tarsitis, one is apt to use the knife in an exploratory incision for some focus of pus, and it is surprising how often one can elicit the history of the lesion having been incised for suspected hordeolum.

The following cases illustrate very adequately the salient features of specific tertiary tarsitis.

The first is by Harry Gradle, who reports a case of specific tarsitis¹⁴ occurring in a female who gave a definite specific history. Tarsus enormously swollen and because of a feeling of fluctuation that was present an incision was made in the hope of finding fluid. None was found. Anti-syphilitic treatment ineffective until after three months and at the end of five months the case was cured.

A. C. Sautter¹⁵ also records a case which illustrates these points.

The patient was a colored man aged 25 years, the victim of malignant syphilitic infection. There was an early diffuse (probably) gummatous infiltration of the tarsus and the adjacent glandular tissue. Ten weeks after the primary sore in the usual location he came for treatment of what seemed to be a chalazion in the left lower lid. An incision was followed by some bleeding, but no discharge of secretion. The lesions then successively involved the upper left and right lower lids. While in the lower lids the swellings resembled chalazia, in the left upper lid a diffuse inflammatory swelling occurred, associated with some pain and tenderness and pre-auricular glandular involvement. The conjunctival surface of this lid presented shallow ulcerations, also a larger marginal ulcer and a number of subconjunctival lardaceous infiltrations.

The patient had been under mercurial inunctions for the past three months; slight improvement. Gave an injection of intravenous salvarsan, which was followed by rapid improvement and retrogression of all lid lesions. The case on clearing up left slight marginal swellings of the tarsus, also at the site of the former marginal ulcer of the left upper lid there was a roughened area devoid of cilia. The other lids were normal.

The following case occurring in our practice well illustrates the difficulties in diagnosis of tarsitis luetica:

Complaint: Upper lid red and swollen.

Duration: Five months.

History: First noticed the upper lid of the right eye to be

swollen. This soon became red and markedly oedematous. At the lid margin soon noticed a small swelling, which broke down into an ulcer which had a nibbled, punched-out appearance. There has never been any pain. He had been treated by a very able colleague, who incised the lid without finding any fluid or any material benefit.

An examination of the patient at the time he came to me showed considerable oedema extending all over the upper lid to the upper part of the orbit. This oedema caused a ptosis of the lid which was quite noticeable. Midway between both canthi on the ciliary border of the lid was a small indurated ulcer. This ulcer was about the size of a small bean and looked unhealthy and was of a chronic nature. It had remained in this condition for several months. One thing of note was the definite absence of cilia corresponding to the ulcerous area.

From the appearance of the lid and the chronic appearance of the small ulcer we suspected some underlying general condition to be the cause of his eye trouble, and a tentative diagnosis of specific tarsitis was made.

Was able to elicit the history of the patient having a hard chancre in the usual location about 15 years previously. Also shortly after this infection the patient had sore throat, and this was followed by regurgitation of fluids through the nose and difficulty in swallowing.

A Wassermann made the day after I first saw him gave a 4+ reaction. Administered salvarsan three days later, and followed with mercurial inunctions and potassium iodide. From this time his eye condition began to improve rapidly, and soon all evidence of the disease disappeared, with the exception that it left as a sequella some entropion and at the site of the ulcer there was an absence of cilia, as well as a punched-out scar, with more or less obliteration of the usual intermarginal border.

Sydney Stephenson¹⁶ reports a case of tubercular iodism simulating gumma of the eyelid. The patient had a lesion of the lower lid having all the appearance of a gumma. Patient had been under treatment for lues for about one year. Had been treated with 30 grains of potassium iodide t. i. d.

"Remarks: Of the various skin lesions that may on occasion follow the internal administration of potassium iodide, that described in the present communication is probably the rarest."

The breaking down of the lesion is so similar to gumma that according to Stephenson, two patients had been dosed into their

graves by the pushing of the very drug which was the original cause of their trouble.

Not all cases of specific tarsitis occur in adults. Fener¹⁷ reports a case of congenital tarsitis in an infant of three months, the subject of hereditary lues. The swelling was so intense that the upper lid edge reached the margin of the lower orbital wall. Autopsy showed congenital lues.

In the tertiary stage Luedde emphasizes¹⁸ the difficulty of diagnosis between gumma at the inner canthus and dacryocystitis. He mentions a case where irrigation showed that the lacrimal passages were clear. Condition not improved by operation. Lues suspected. Case cleared up on administration of large doses of potassium iodide.

The cases I have endeavored to report are typical cases that I have selected from literature in order to illustrate the varied forms in which lues may manifest itself in the palpebrum.

Concerning the laboratory aids in diagnosis, I already mentioned the examination for the Spirochete and the Wassermann reaction. To these we might add the Luetin test, which though not likely to yield a positive result in primary or secondary syphilis, often can be used in the tertiary stages to clinch a diagnosis, where the Wasserman has proven negative. Here we might emphasize the well-known fact that in the late tertiary stages the Wassermann reaction is only obtained in about two-thirds of positive cases. This is the place where the Luetin test is really of value as a supplementary aid in the diagnosis.

Referring again to the Wassermann, might mention the fact that in the primary stage the average time before this reaction can be obtained is the third week, hence here the only laboratory aid in the diagnosis is again, as mentioned above, the search for the Spirochete.

In conclusion we may briefly summarize as follows:

1. Syphilis of the eyelids, although relatively a rare affection, occurs with sufficient frequency to justify our serious consideration.

2. From 3 to 5 per cent of all extragenital primary affections are on the eyelids. The sources of infection are various, through kissing, removing foreign bodies with the tongue, etc. In this connection it has been well said that the sources of infection are as various as the possibilities for placing the Spirochete in contact with the eye.

3. The clinical diagnosis is oft times perplexing. We must observe unrelentingly its differential aspect, holding well in mind

that it simulates hordeolum, chalazion, tuberculosis, vaccine pustule, etc.

4. A chronic indolent lesion of the eyelid, with which is associated an enlargement of the preauricular and submaxillary gland, justifies a tentative diagnosis of specific involvement, and is an indication for a strict interpretation of any possible underlying specific disturbance. We should be remiss in our fullest duty in these cases if we failed to employ such well-known laboratory methods which could have a clarifying effect on the situation.

5. The three essential laboratory aids in diagnosis, in order of value, are the Wassermann, the search for the Spirochete, and the luetin test.

6. Under the head of prognosis and treatment we wish again to emphasize that the intravenous injection of salvarsan, in these cases, stands in the first rank, supplemented by inunctions of ung. hydrarg. and last but by no means least, the use of potassium iodide in liberal doses.

7. It has been well said that when the cornea participates in the process the prognosis is much more grave. By a timely recognition of the character of the disturbance much can be averted, and what is very important, we can spare ourselves the negative effect of an uncertain, wavering and mistaken diagnosis.

Discussion.

I was very glad to witness the interest manifested in the discussion of this important subject. My purpose in bringing this paper before the Academy is to emphasize the difficulties and make clear as far as possible the differential aspects of what is often a perplexing diagnostic problem, and we wish again to call attention to the following factors in the diagnosis.

We have laid particular stress on Adenopathy as being of prime importance in the diagnosis of palpebral lues. The presence of preauricular or submaxillary lymphatic involvement in the face of a chronic indolent process of the eyelids can, in the majority of cases, be definitely assumed to be due to lues.

Adenopathy is of such a constant character in this affection, acting very often as a sheet anchor, that we beg leave to briefly enumerate the ocular lesions in which we usually find preauricular or submaxillary participation.

They are as follows:

1. Parinaud's conjunctivitis has one of its classical symptoms, an enlargement, even to the extent of suppuration, of the pre-

auricular gland. Its semi-translucent vegetations, superficial ulcers, etc., render a differential diagnosis of easy solution.

2. Lupus or tuberculosis of the lid, which is also associated with lymphatic involvement, can be distinguished by its superficial nature, and its tendency to heal in one area while spreading in another region. The enlarged glands, however, as a rule are painless, as in enlargement following lues.

3. Epithelioma. Here we have an involvement of the lymphatic glands, and this enlargement is one of the distinguishing points between epithelioma and rodent ulcer involving the lids. There is usually considerable pain. Its most common location is the lid margin and the outer commisure. The occurrence of this growth has as its main differential characteristics, from lues, are pain, and its occurrence in elderly people.

4. Hordeolum internum is not unfrequently associated with enlargement of the preauricular or even the submaxillary gland. The outstanding differential feature here is that the enlargement accompanying hordeolum is painful, whereas in lues the enlargement is quite painless.

5. We have the acute processes to consider, such as gonorrhoeal conjunctivitis, etc., but this is more apt to be in the nature of a bubo and the nature of the acute process is such as to be readily distinguished.

6. Emphasis may again be made on the invaluable assistance given by the laboratory aids in doubtful syphilitic affections of the lids. Their order of importance are, the Spirochetal findings, the Wasserman, and lastly the Luetin test. We employ old salvarsan intravenously, give the injections one month apart, and usually two or three injections suffice. This is supplemented and reinforced by well-known inunctions of unguentum hydrargarum and potassium iodide in tertiary lesions, depending more, however, on salvarsan and rapid mercurilization.

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STATE LEGISLATION CONCERNING OPHTHALMIA NEONATORUM.

PAPER NUMBER TWO.

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This paper will not discuss the general subject of Ophthalmia Neonatorum; this is not necessary in an ophthalmological journal. It will merely endeavor to help the movement intended to exterminate this disease, especially by recording the various state procedures, calculated to produce this desirable result.

Before proceeding to review the separate state methods of controlling Ophthalmia Neonatorum, it may be well to emphasize a few facts concerning this disease that are sometimes, but never should be, forgotten.

First. Ophthalmia Neonatorum is responsible for about 20 per cent of the blind in the United States and for about 25 per cent of the inmates of blind asylums.

Second. It costs about \$30.00 a year to educate an ordinary child, and about \$400.00 a year to educate and care for a blind child. This does not take into consideration the many financial and sociological side-lights to blindness, and the personal and state misfortunes incident to blindness, and unproductive citizenship.

Third. There are about fifty blind schools in the United States, costing about \$2,000,000 a year to maintain.

Fourth. Ophthalmia Neonatorum costs the United States about \$7,000,000 per annum, in actual money.

Fifth. Next to optic nerve atrophy, Ophthalmia Neonatorum is the most prolific cause of blindness in the United States.

Sixth. The Cr  d   treatment for *all* new-born children would almost entirely eliminate Ophthalmia Neonatorum and its dreadful consequences from the world.

Seventh. The use of this evidently necessary treatment is by no means universal, and its omission is not confined to midwives. Some reputable physicians use it invariably; others, *never* use it; still others use it when conditions are suspicious. In order to accomplish its purpose the use of this treatment should be invariable. It should become recognized as an integral part of a woman's confinement, and as a reliable provision against blindness. It should be understood that gonorrhoea is not the only

condition that will produce this disease, but that it may occur from other and non-disgraceful causes.

Eighth. Midwives are a financial and sociological necessity. Fully one-half the confinements are attended by midwives. If it were not for midwives most of these cases would be merely looked after by friends and relatives. Midwives should be educated, examined, licensed, and inspected, and should always call in medical assistance in complicated cases. The first school of this kind was established in 1913 at Bellevue Hospital, New York City, and has abundantly proven its usefulness. Intelligent women are receiving these instructions, and many graduated nurses have undertaken midwifery as a profession.

Ninth. Births should be compulsorily reported within a few hours. The ocular condition should be reported, and the physician should state whether or not he has used the prophylactic treatment. The method of using the prophylactic, and the state law (if any exists) should be printed on the report blank. Immediate action should follow reporting. By action is meant medical attendance (hospital preferred), nursing, etc.

Tenth. Suitable laws should be passed in each state, providing for the invariable use of Credé prophylaxis in all newly born children, and proper penalties should be imposed for the non-observance of such instruction. Such laws should be not only enacted, but observed. A few punishments for disobedience would result in the universal state observance of the law.

Laws in themselves are not sufficient: they must be obeyed. One of the best means of insuring such obedience is to create intelligence on this subject, by propaganda, publicity, etc. Every legitimate method of educating and enlightening the people, the midwives and the doctors should be encouraged. If this is done, and proper laws are passed and obedience enforced, it will not be long before the Credé idea of preventing much needless blindness will become a matter of course, and its use demanded by expectant mothers and their families.

Eleventh. While not prophesying as to what the future may produce, in the way of prophylaxis, it is reasonably certain that at present there is no remedy that can take the place of nitrate of silver. Argryrol, protargol, callorgal, and many other remedies have been proposed, enthusiastically indorsed, widely used, and gradually abandoned. Nitrate of silver alone has stood the test of time. The ideal remedy is of course one that:

1. Reliably destroys the micro-organisms.
2. Does not injure the eye.
3. Does not produce prolonged redness.
4. Does not cause pain.
5. Does not deteriorate by time, light or exposure.
6. Can be freely used.

Unfortunately, nitrate of silver only responds to one of these qualifications, viz., it reliably destroys the micro-organisms. It does, however, sometimes injure the epithelium, produce prolonged redness, cause pain, deteriorate by time, light and exposure, and should not be freely used. There is, therefore, room for improvement, and it is hoped that a perfect drug will be found; but until then, nitrate of silver should be the standard remedy, for it can almost invariably be depended on to destroy the micro-organisms, and after all that is the main thing to be considered. Besides this all the objections to its use are really trifling, and can be easily overcome. Cases of injuries to the epithelium are extremely rare; continued redness is not often seen; the pain is slight and temporary; deterioration can be overcome by only using absolutely fresh solutions; and it is easy to only use 1 or 2 drops. Many careful observers believe that the 2 per cent solution of Credé is unnecessarily strong and severe, and that just as good results will be attained by a 1 per cent solution, thus reducing by one-half the objections to its use. It is quite possible that this view is correct. It should not be forgotten, however, that cases where a 2 per cent solution have produced really objectionable results are extremely rare, and might have been easily due to drug deterioration, rather than to drug strength. The cloudiness in a deteriorating silver solution is due to the liberation of free nitric acid, which is, of course, very irritating to the delicate ocular epithelium.

In order to provide free and reliable silver solutions some states and cities prepare and distribute fresh and carefully compounded solutions to doctors and midwives on application. For instance, New York State distributed last year nearly 20,000 outfits of a 1 per cent solution of silver. Circulars in English, Italian and Polish were freely distributed through about 1,600 health officers to doctors and midwives. It cost about \$5,000. Think of the economy of this measure, to say nothing of its benefits to individuals, families, municipalities and mankind in general. Free distribution does not imply parsimoniousness on the part of doctors and midwives. It is done to provide reliable aseptic solutions,

to prevent accidents in writing prescriptions and in druggists' work, to insure against drug deterioration, etc.

Twelfth. One almost insurmountable difficulty in the way of proper treatment of Ophthalmia Neonatorum is the paucity of resources in combating the disease. This disease apparently has no friends. Nobody wants it around. A small hospital should be established in all large cities for the prompt reception of such cases. Or it should be clearly understood by health officers, doctors, midwives, visiting nurses, etc., that certain hospitals will receive such patients, in special wards, at any time, day or night, and undertake to provide expert medical attendance, care, day and night nursing, etc. Mothers who are nursing their babies should either stay with them or come at stated intervals to continue the nursing. In no other way can this disease be successfully handled. Its progress is swift and terrible. A few hours may mean permanent blindness. There is no time to wonder what can be done. This should all be understood beforehand, and prompt action *immediately* taken. Private homes, especially of the squalid variety, are no places for the treatment of this disease.

Thirteenth. Health Departments in the larger cities should employ an experienced eye nurse to search out and follow up cases of Ophthalmia Neonatorum, and to see that immediate action is taken when cases are found.

Fourteenth. I believe that great benefit would be accomplished if brief and pointed "leaflets" could be freely distributed in several different languages. Such "leaflets" should be sent by some central organization (such, for instance, as the Conservation of Vision Committee of the A. M. A.) to different organizations in the different states, such as boards of health, dispensaries, to be freely distributed to doctors, midwives, expectant mothers, etc. I am here submitting a sample of such a "leaflet."

What to Do Before the Baby Is Born.

1. The care of a child's eyes begins BEFORE it is born.
2. The mother's parts, through which the child passes at birth, should be washed several times a day with soap and water, for about one week before the baby is born.
3. If a discharge comes from these parts, the mother should at once consult a good doctor, at his or free dispensary, for this discharge, if not stopped, will be a TERRIBLE POISON to the baby's eyes.

4. This discharge may be caused by "The Bad Disease," or it may not.

In either case it should be stopped, OR A BLIND BABY MAY BE THE RESULT.

5. If for any reason a doctor is not consulted, the mother should not only keep her parts clean, with soap and water, but she should get a fountain syringe and syringe out her parts, several times a day, with warm, boiled, soap and water.

6. The mother should be careful to keep her hands clean and to keep her hands away from her eyes, or she may get some of the poison in her own eyes, and cause blindness.

7. All cloths, etc., used by her in cleaning her parts SHOULD BE BURNED, as they may be full of poison. It is better to get quantities of cheap cheese cloth and then burn it.

8. If the mother has a discharge coming from her parts, she should keep away from the other people in the family as much as possible, for she may poison them and cause the same disease, and possibly blindness.

9. If the mother has a discharge, she should try and use a separate water closet or vessel, and keep everything perfectly clean with soap and water cleansings.

10. IT WOULD BE BETTER FOR BABIES TO BE BORN IN HOSPITALS, where everything is convenient and clean, and where the mother may be sure of a good doctor and nurse, and where, if mothers are too poor to pay out money, they can be cared for free.

11. If the mother does not go to a hospital she should, if possible, call in a good doctor, as midwives are unsafe.

12. If the mother is poor, she should not forget to call a visiting nurse. THEY KNOW THEIR BUSINESS, and CAN TELL THE MOTHER what to do.

What to Do After the Baby Is Born.

1. As soon as the head is born the mouth should be swabbed out with a cloth upon a finger, the face should be washed with clean water, and the lids should be especially cleaned.

2. After the child is separated from the mother, the face should be again washed, WITHOUT SOAP, giving especial attention to the lids.

3. The eyes should now be washed out with a Solution of Boracic Acid. To do this, take a pint of clean water that has been boiled and allowed to cool. Then put two teaspoonfuls of Boracic Acid in the water and stir it up with a clean spoon. Then

open the baby's eyes and flush them out with a few teaspoonfuls of this solution.

4. The lids should now be opened and two or three drops of a 2 or 1 per cent Solution of Nitrate of Silver should be carefully dropped into the eyes.

BE SURE the medicine gets INTO the eyes.

This should be done ALWAYS, EVEN in cases where there is no reason to suspect disease.

IT ALMOST SURELY PREVENTS DANGEROUS "BABY'S SORE EYES!"

5. The drops usually make the eyes a little red for a few hours, but this does no harm.

IF IT IS NOT DONE, A BLIND BABY MAY BE THE RESULT!

6. Mothers should BE SURE that this is done, EVEN if the doctor does not think it necessary.

7. Mothers should not think that breast milk, or tea leaves, or poultices, or ANYTHING ELSE, will serve the purpose. Cleanliness and the Nitrate of Silver Solution are the only things that will do: ESPECIALLY THE SILVER SOLUTION.

8. If the baby's eyes get red a few days after birth, THE BABY SHOULD BE TAKEN TO A GOOD DOCTOR AT ONCE. Or, better still, take the baby to a good eye doctor AT ONCE.

DO NOT WAIT, thinking it is "just a little cold," and hoping the eyes will get better in a day or two.

10. Do not listen to what the neighbors say. CONSULT A DOCTOR AT ONCE. DELAY MAY MEAN BLINDNESS TO THE BABY.

11. If a newly born baby has "Sore Eyes," the best place for it is IN A GOOD HOSPITAL, where it can be properly cared for. Such cases require careful treatment EVERY HALF HOUR DAY AND NIGHT. If the child is not taken to a hospital, however, TWO paid nurses, or TWO visiting nurses, should take care of the baby, day and night.

ALL THIS COULD HAVE BEEN PREVENTED IF THE SILVER SOLUTION HAD BEEN DROPPED INTO THE EYES WHEN THE BABY WAS BORN!

12. All cloths, cotton, etc., used around the baby's eyes should be INSTANTLY BURNED. Every one touching or treating the baby should keep perfectly clean. THE HANDS SHOULD ALWAYS BE WASHED IMMEDIATELY AFTER TOUCHING

THE BABY. People coming in contact with a baby having "Sore Eyes" should, if possible, be kept in a SEPARATE ROOM, away from the rest of the family.

On the first or outside page will be the following printed matter:

Babies' Sore Eyes and How to Prevent Them.

CLEANLINESS AND TWO DROPS OF THE FOLLOWING FORMULA WOULD HAVE PREVENTED THIS CHILD FROM BECOMING BLIND. (Picture of a blind child.)

Nitrate of Silver, 8 grains, or 4 grains.

Distilled water, 1 ounce.

Put 2 drops in the baby's eyes immediately after birth. The face and lids should first be cleaned with pure warm water.

THIS FORMULA CAN BE OBTAINED AT ANY DRUG STORE, AND MUST BE USED ON EVERY BABY.

Published under the auspices of the Committee on the Conservation of Vision of the Council on Health and Public Instruction of the American Medical Association.

On the back of the page could be printed the following:

These leaflets can be obtained by writing to Dr. F. R. Green, Council on Health and Public Instruction, American Medical Association, 535 N. Dearborn St., Chicago, Ill.

In order that it may be clearly seen just what has been done in the United States to materially lessen the prevalence of Ophthalmia Neonatorum, I will now give in detail the various laws concerning this disease, and afterwards draw some deductions therefrom.

NEW JERSEY.

1895.

1. Be it enacted by the Senate and General Assembly of the State of New Jersey, That should one or both eyes of an infant become inflamed, swollen or reddened, or show any unnatural discharge at any time within two weeks after its birth, and no legally qualified practitioner of medicine be in attendance upon the infant at the time, it shall be the duty of the midwife, nurse, attendant or relative having charge of such infant to report the fact in writing within six hours to the local board of health of the city, township or other municipality in which the parents of the infant reside.

2. And be it enacted, That the said local board of health shall direct the parents or persons having charge of such infant suffering from such inflammation, swelling, redness or unnatural discharge

of the eyes to immediately place it in charge of a legally qualified practitioner of medicine, or in charge of the physicians of the city, township or other municipality if unable to pay for medical services.

3. And be it enacted, That every local board of health in the State of New Jersey shall furnish a copy of this act to every legally qualified practitioner of medicine, and to each person who is known to act as a midwife, or nurse, in the city, township or other municipality for which such board of health is appointed; and the secretary of state shall cause a sufficient number of copies of this act to be printed, and to supply the same to such officers for distribution.

4. And be it enacted, that any failure to comply with the provisions of this act shall be punished by a fine not to exceed two hundred dollars, or imprisonment not to exceed six months, or both, upon conviction, under prosecution proceedings to be brought by any local board of health.

5. And be it enacted, That this act shall take effect and be in force on the first day of May, one thousand eight hundred and ninety-five.

AMENDMENT.

1911.

1. The State Board of Health shall furnish, free of cost, to physicians and midwives, registered under the laws of this State, such prophylactic remedies as it may deem best for the prevention of ophthalmia neonatorum, together with such instructions as it may deem necessary for the proper administration of the same.

2. The sum of two thousand dollars is hereby appropriated for the purpose of carrying out the provisions of this act when included in the annual or supplemental appropriation bill.

3. This act shall take effect immediately.

IOWA.

1896.

Section 1. Should one or both eyes of an infant become inflamed, or swollen, or reddened at any time within two weeks after its birth, it shall be the duty of the midwife, parent, guardian, or nurse, or other persons having charge of such infant to report within six (6) hours after the discovery thereof by such person in charge of such infant to the health officer or some legally qualified practitioner of the city, town or district in which the parents of the infant reside, the fact that such inflammation, or swelling, or redness of the eyes exists.

Sec. 2. It is hereby made the duty of attending physicians or

midwives to instruct parents and nurses in regard to the provisions of this act and danger of sore eyes in infants.

Sec. 3. Any failure to comply with the provisions of this act shall be punished by a fine of not less than twenty-five dollars or more than one hundred dollars, or imprisonment in the county jail not to exceed 30 days or both.

SOUTH CAROLINA.

1896.

This is a law passed by the State Board of Health and endorsed by the State Legislature:

Should one or both eyes of an infant become reddened or inflamed at any time after birth, it shall be the duty of the midwife or nurse or person having charge of said infant to report the condition of the eyes at once to the local Board of Health of the city or town in which the parents of the infant reside. Any failure to comply with the provisions of this section shall be punishable by a fine not to exceed twenty-five dollars, or imprisonment not to exceed one month, or both. This section shall not apply to towns or cities of less than one thousand inhabitants.

MISSOURI.

1899.

Should one or both lids of either eye or of both eyes of an infant become red or swollen, or should there be any discharge from either eye or from both eyes, at any time within three weeks after its birth, it shall be the duty of the midwife, nurse or other person having charge of said infant, at once, unless for good cause shown, to report the condition of said eyes to a legally qualified practitioner of medicine.

CONNECTICUT.

1902.

Should one or both eyes of an infant become inflamed or swollen, or reddened at any time within two weeks after its birth, the midwife, nurse or attendant having charge of such infant, shall report in writing, within six hours, to the health officer or board of health of the city, town, or borough in which the parents of the infant reside, the fact that such inflammation, swelling, or redness of the eyes exists. Every person violating the provisions of this section shall be fined not more than two hundred dollars."

MAINE.

1903.

Sec. 90. If one or both eyes of an infant become reddened or inflamed at any time within four weeks after birth, the midwife,

nurse or person having charge of said infant shall report the condition of the eyes at once to some legally qualified practitioner of medicine of the city, town or district in which the parents of the infant reside. Any failure to comply with the provisions of this section shall be punishable by a fine not to exceed one hundred dollars, or imprisonment not to exceed six months.

MARYLAND.

1904.

If any time within two weeks after the birth of any infant one or both of its eyes or the eyelids be reddened, inflamed, swollen or discharging pus, the midwife, nurse or person other than a legally qualified physician, in charge of such infant, shall refrain from the application of any remedy for the same, and shall immediately report such condition to the health commissioner or to some legally qualified physician in the city, county or town wherein the infant is cared for. Any person or persons violating the provisions of this section shall on conviction be punished by a fine not to exceed one hundred dollars, or by imprisonment in jail not to exceed six months, or by both fine and imprisonment.

MASSACHUSETTS.

1905.

Section 1. Section forty-nine of chapter seventy-five of the Revised Laws is hereby amended by inserting after the word "contagion," in the ninth line, the words: Should one or both eyes of an infant become inflamed, swollen and red, and show an unnatural discharge at any time within two weeks after its birth, it shall be the duty of the nurse, relative or other attendant having charge of such infant to report in writing within six hours thereafter, to the board of health of the city or town in which the parents of the infant reside, the fact that such inflammation, swelling and redness of the eyes and unnatural discharge exist. On receipt of such report, or of notice of the same symptoms given by a physician as provided by the following section, the board of health shall take such immediate action as it may deem necessary in order that blindness may be prevented—so as to read as follows:

Section 49. A householder who knows that a person in his family or house is sick of smallpox, diphtheria, scarlet fever or any other infectious or contagious disease dangerous to the public health, shall forthwith give notice thereof to the board of health of the city or town in which he dwells. Upon the death, recovery or removal of such person, the householder shall disinfect to the satisfaction of the board such rooms of his house and articles

therein as, in the opinion of the board, have been exposed to infection or contagion. Should one or both eyes of an infant become inflamed, swollen and red, and show an unnatural discharge at any time within two weeks after its birth, it shall be the duty of the nurse, relative or other attendant having charge of such infant to report in writing within six hours thereafter, to the board of health of the city or town in which the parents of the infant reside, the fact that such inflammation, swelling and redness of the eyes and unnatural discharge exist. On receipt of such report, or of notice of the same symptoms given by a physician as provided by the following section, the board of health shall take such immediate action as it may deem necessary in order that blindness may be prevented. Whoever violates the provisions of this section shall be punished by a fine of not more than one hundred dollars.

Section 2. Section fifty of chapter seventy-five of the Revised Laws is hereby amended by inserting after the word "health," in the third line, the words:—or if one or both eyes of an infant whom or whose mother he is called to visit become inflamed, swollen and red, and show an unnatural discharge within two weeks after the birth of such infant—so as to read as follows: Section 50. If a person knows that a person whom he is called to visit is infected with smallpox, diphtheria, scarlet fever or any other disease dangerous to the public health, or if one or both eyes of an infant whom or whose mother he is called to visit become inflamed, swollen and red, and show an unnatural discharge within two weeks after the birth of such infant, he shall immediately give notice thereof in writing over his own signature to the selectmen or board of health of the town; and if he refuses or neglects to give such notice, he shall forfeit not less than fifty nor more than two hundred dollars for each offense.

MASSACHUSETTS.

1912.

Section 1. Section seventeen of chapter twenty-nine of the Revised Laws is hereby amended by inserting after the word "explanations," in the sixth line, the words:—including an explanation that chapter two hundred and fifty-one of the acts of the year nineteen hundred and five requires physicians, nurses, relatives or other attendants to report immediately to the local board of health every child one or both of whose eyes become inflamed, swollen and red and show an unnatural discharge within two weeks after birth—so as to read as follows: Section 17. The secretary of the commonwealth shall, at the expense of the commonwealth,

prepare and furnish to the clerks and boards of health of cities and towns, and to the superintendent of the state hospital, record books, books for indexes thereto, forms for returns, on paper of uniform size, and any necessary instructions and explanations, including an explanation that chapter two hundred and fifty-one of the acts of the year nineteen hundred and five requires physicians, nurses, relatives or other attendants to report immediately to the local board of health every child one or both of whose eyes became inflamed, swollen and red and show an unnatural discharge within two weeks after birth. City and town clerks shall distribute the blank forms as the secretary shall direct. A city or town may provide such books and forms if they conform to those prepared by the secretary.

Section 2. This act shall take effect upon its passage.

ACTS OF 1910, 458.

Section 1. The state board of health shall furnish free of cost, to physicians registered under the laws of the commonwealth, such prophylactic remedy as it may deem best for the prevention of ophthalmia neonatorum.

Section 2. To carry out the provisions of this act there may be expended annually from the treasury of the commonwealth a sum not exceeding twenty-five hundred dollars.

VERMONT.

1910.

Section 1. The State Board of Health is hereby empowered to make such rules and regulations as may be deemed necessary for the prevention of blindness caused by the disease known as ophthalmia neonatorum, and may furnish at public expense such prophylactic outfits as are necessary for the use of physicians.

Sec. 2. Any physician who fails to comply with the regulations established under Section 1 of this Act shall be fined ten dollars for each offense, and it shall be the duty of the state's attorney to prosecute in all cases on complaint of a local board of health.

Sec. 3. This act shall take effect from its passage.

The following is the reading of the rule of the State Board of Health of Vermont, which is virtually a law, through the endorsement of the Legislature:

Rule 29. *Ophthalmia Neonatorum*: Report and Treatment. All cases of ophthalmia neonatorum must be reported by the health officer to the secretary of the State Board of Health.

Should one or both eyes of an infant become inflamed, swollen and red, and have an unnatural discharge at any time within two

weeks after its birth, the nurse, relative, or other person having charge of such infant shall report in writing, within six hours thereafter, to the local health officer of the town or city in which the parents of the infant reside, the fact that such inflammation, swelling and redness exists. Such health officer shall take such immediate action as may be necessary in order that the blindness may be prevented, and shall see that all physicians in his territory are supplied with nitrate of silver solution, furnished by the State Board of Health.

WASHINGTON, D. C.

Ordered: That the following regulations for the prevention of blindness in newly-born infants in the District of Columbia are hereby made, to be effective on and after September 27, 1911:

Section 1. Whenever any midwife, or any person other than a registered physician, is in attendance upon any case of childbirth, and the newly-born child has inflammation of the eyes, attended by a discharge therefrom, said midwife or other person shall report that fact in writing to the health officer, so that said report shall be received by the health officer within the six hours after the existence of said discharge becomes known to said midwife.

Sec. 2. No midwife or person other than a registered physician shall treat any case of inflammation of the eyes of a newly-born child attended by a discharge therefrom, for any period longer than may be absolutely necessary to obtain the services of a registered physician.

Sec. 3. Any person who violates any of the provisions of these regulations shall, upon conviction thereof in the police court, be punished by a fine not exceeding forty dollars. Prosecutions for violations of the provisions of these regulations shall be on information filed in the police court by the corporation counsel of the District of Columbia or by any of his assistants.

Official copy furnished Health Department.

By order:

WM. TINDALL, Secretary.

NORTH DAKOTA.

1911.

1. Duty of Physician, Midwife or Other Attendant: That whenever a child is born, the physician, midwife or any other person who is present and engaged as professional attendant, shall report said birth on a blank supplied by the State Board of Health to the health officer having jurisdiction, within thirty-six hours after such birth occurs. Said birth certificate in addition to other data ordered by the State Board of Health shall have upon it this

question: "Were precautions taken against ophthalmia neonatorum?" And it shall be a violation of this act for any physician or midwife in professional attendance at a birth to fail to report same as herein commanded or to omit answering said question: "Were precautions taken against ophthalmia neonatorum?" All bills or charges for professional services rendered at a birth shall be unlawful if report is not made as herein commanded.

2. Same. It shall be the duty of all physicians or midwives in professional attendance upon a birth to always carefully examine the eyes of the infant, and if there is the least reason for suspecting disease of the eyes, then said physician or midwife in professional attendance shall apply such prophylactic treatment as may be recognized as efficient in medical science.

3. Same. Exception. Should one or both eyes of an infant become inflamed, swollen or reddened, or show any unnatural discharge or secretion at any time within two weeks after its birth, and no legally qualified physician is in attendance upon the infant at that time, it shall be the duty of the parents, or in their absence, whoever caring for said infant, to report the fact in writing within six hours after discovery, to the health officer having jurisdiction. Provided, said report to said health officer need not be made from recognized hospitals.

4. Duty of Health Officer. Upon receipt of a report as set forth in section 3 of this act, health officers shall direct the parents or whoever has charge of such infant suffering from such inflammation, swelling, redness or unnatural secretion or discharge of the eyes, to immediately place it in charge of a legally qualified physician or in charge of the city or township physician if unable to pay for medical services.

5. Penalty. Any violation of the provisions of this act shall be punished by a fine of not less than ten dollars nor more than fifty dollars.

6. Emergency. Whereas, about thirty per centum of all blindness is caused by the preventable disease known as ophthalmia neonatorum; and this disease may always be prevented, and almost always cured in its incipency, and its existence is generally due to ignorant or careless management; and, whereas, an emergency exists, therefore this law shall be in force after its passage and approval.

UTAH.

1911.

Section 1. It shall be the duty of every physician and every midwife attending a case of childbirth to report to the local Board of Health every case where the newly-born child has inflammation of the eyes attended by a discharge therefrom. Such report to be made within six hours after the appearance of such disease. It shall be the duty of such physician or midwife to treat the eyes of the child so afflicted in accordance with the rules of the State Board of Health. Every physician and midwife failing to comply with the provisions of this act shall be guilty of a misdemeanor.

In conformity with the foregoing enactment, the State Board of Health has adopted the following rules to be of general application throughout the State:

Rule 1. No midwife shall treat any case of ophthalmia neonatorum or inflammation of the eyes of a newly-born infant unless it is impossible to secure the services of a physician, provided that in case the services of a physician shall be secured, a midwife may begin and carry out treatment until his arrival.

Rule 2. In the event that the services of a physician cannot be secured, midwives are authorized to use and apply the following treatment:

Immediately upon the discovery in a newly born infant of an inflammation of the eyes, attended by a mattery discharge therefrom, five (5) drops of a twenty per cent (20%) solution of argyrol shall be dropped into the eyes with an eye dropper, after having separated the lids with the thumb and forefinger; and this treatment shall be repeated every hour for four (4) days and longer if a discharge is still present. After four (4) days if the discharge has ceased, the treatment may be reduced in frequency to intervals of four (4) times daily for several days, until it is shown that the discharge is not liable to return.

Before each application of the argyrol solution, the eyes should be thoroughly irrigated and cleansed by dropping or pouring into them a one per cent (1%) solution of chloride of sodium (common salt) or a saturated solution of boric acid. For practical purposes the salt solution may be prepared by dissolving one teaspoonful of salt in a pint of water.

Note—The person treating the eyes should exercise the utmost care to avoid touching the cornea (eyeball), as there is great danger of causing serious injury thereby. In applying the treatment the child should be placed flat upon its back and the head

so held that the solution will not quickly escape from the eyes.

Inasmuch as the secretions from the eyes are very infectious, care should be taken to destroy all articles contaminated by them, and to sterilize the hands after each treatment.

The treatment above described is considered by eminent authorities to be entirely effective and safer than solutions of nitrate of silver; and it is recommended to all physicians in general practice.

Solutions of argyrol quickly deteriorate and should be freshly prepared for every case. Upon request the State Board of Health will furnish materials for preparing fresh solutions.

It is recommended that physicians and midwives shall make one application of the argyrol solution at the birth of every child as a prophylactic or preventative treatment, after having first thoroughly wiped the eyes with absorbent cotton or soft clean linen and bathed them with a saturated solution of boric acid.

Rule 3. On receipt of notification under this act, it shall be the duty of the local health officer to immediately investigate the case and satisfy himself that the rules of the State Board of Health are properly complied with. He shall also immediately report the case to the State Board of Health by telephone or telegraph.

INDIANA.

1911.

Whereas, About thirty per centum of all blindness is caused by the preventable disease known as ophthalmia neonatorum; and

Whereas, This disease may always be prevented, and almost always cured in its incipency, and its existence is generally due to ignorant or careless management; therefore,

Ophthalmia Neonatorum—Birth Return.

Section 1. Be it enacted by the General Assembly of the State of Indiana, That whenever a child is born, the physician, midwife or any other person who is present and engaged as professional attendant, shall report said birth on a blank supplied by the State Board of Health to the health officer having jurisdiction, within thirty-six hours after such birth occurs. Said birth certificate in addition to other data ordered by the State Board of Health shall have upon it this question: "Were precautions taken against ophthalmia neonatorum?" And it shall be a violation of this act for any physician or midwife in professional attendance at a birth to fail to report same as herein commanded or to omit answering said question: Were precautions taken against ophthalmia neonatorum? All bills or charges for professional services

rendered at a birth shall be unlawful if report is not made as herein commanded.

OPHTHALMIA NEONATORUM—BIRTH RETURN.

Physicians and Midwives—Examination of Eyes.

Sec. 2. It shall be the duty of all physicians and midwives in professional attendance upon a birth to always carefully examine the eyes of the infant, and if there is the least reason for suspecting infection of one or both eyes then said physician or midwife in professional attendance shall apply such prophylactic treatment as may be recognized as efficient in medical science.

Parents or Attendant—Report.

Sec. 3. Should one or both eyes of an infant become inflamed, swollen or reddened, or show any unnatural discharge or secretion at any time within two weeks after its birth, and no legally qualified physician is in attendance upon the infant at that time, it shall be the duty of its parents, or in their absence, whoever is caring for said infant, to report the fact in writing within six hours after discovery to the health officer having jurisdiction. Provided, said report to said health officer need not be made from recognized hospitals.

Health Officer—Duty.

Sec. 4. Upon receipt of a report as set forth in section 3 of this act, health officers shall direct the parents or whoever has charge of such infant suffering from such inflammation, swelling, redness or unnatural secretion or discharge of the eyes, to immediately place it in charge of a legally qualified physician or in charge of the city or township physician if unable to pay for medical service.

Penalty.

Sec. 5. Any violation of the provisions of this act shall be punished by a fine of not less than ten dollars nor more than fifty dollars.

Repeal.

Sec. 6. All parts of laws in conflict with this act are repealed.

TEXAS,

1911.

This is a law of the State Board of Health, transformed into a State law by act of Legislature.

Whenever any nurse, midwife or other person not a legally qualified practitioner of medicine shall notice inflammation of the eyes or redness of the lids in a new-born child under his or her care, it shall be the duty of such person to report the same to the local

health authority, or in his absence any reputable physician, within twelve hours of the time the disease is first noticed.

MINNESOTA.

1913.

Law of State Board of Health endorsed by State Legislature.

It shall be the duty of any midwife, nurse, parent or other person having charge of an infant whose eyes become inflamed, reddened or diseased at any time within two weeks after birth, to report the facts of such affection in writing to the local health officer within twelve hours after ascertaining the facts.

Upon receipt of such report the health officer shall investigate, and unless the case is under the care of a competent physician, he shall give specific written instructions for the immediate medical treatment of the disease and for the precautions to be taken to prevent its spread to other persons.

MICHIGAN.

1913.

Section 1. It shall be the duty of the State Board of Health to officially name and approve a prophylaxis, to be used in treating the eyes of newly born infants, and it shall be the duty of the board to publish instructions for using the same.

Sec. 2. It shall be the duty of any physician, nurse or midwife who shall assist and be in charge at the birth of any infant, or have care of the same after birth, to treat the eyes of the infant with a prophylaxis approved by the State Board of Health; and such treatment shall be given as soon as practicable after the birth of the infant and always within one hour; and if any redness, swelling, inflammation or gathering of pus shall appear in the eyes of such infant or upon the lids or about the eyes, within two weeks after birth, then any nurse, midwife or other person having care of the infant shall report the same to some competent practicing physician within six hours of its discovery.

Sec. 3. Any failure to comply with the provisions of section 2 of this act shall be punishable by a fine not to exceed one hundred dollars or imprisonment in the county jail not to exceed six months, or both such fine and imprisonment in the discretion of the court.

In compliance with the law quoted above, the State Board of Health of Michigan has named and approved two per cent silver nitrate solution as a prophylactic to be used in treating the eyes of newly born infants. The infant's eyes are to be carefully washed with a physiological salt solution, or with boric acid solution, after

which one drop of two per cent silver nitrate solution is to be instilled in each eye.

PENNSYLVANIA.

1913.

Whereas, Statistics show fully thirty (30) per cent of cases of blindness to be due to inflammation of the eyes appearing a few days after birth; and, whereas, experience has proved that this inflammation can be cured, and the eyesight saved in the majority of cases, if the proper treatment be instituted at an early stage of the disease.

Section 1. Be it enacted, etc., That every physician practicing in any portion of this commonwealth who shall treat or examine any infant suffering from ophthalmia neonatorum (inflammation of the eyes of infants) shall, if the said case be located in a township of the first class, a borough, or a city, forthwith make a report in writing to the health authorities of said township, city, or borough; and, if said case shall be located in a township of the second class, or a city, borough, or township of the first class, not having a board of health, or body acting as such, to the State Department of Health, upon blanks supplied for that purpose: in which report he shall, under his or her own signature, state the name of the disease, and the name, age, sex, color, and nativity of the infant suffering therefrom, together with the street and house number of the premises in which said infant may be located, or otherwise sufficiently designate the same, the date of the onset of the disease, the name and occupation of the householder in whose family the disease may have occurred; together with such other information relating to said case as may be required by said health authorities and the State Department of Health.

Section 2. That any midwife, or nurse, or other person having the care of an infant, whose eyes have become inflamed or swollen or reddened at any time within two weeks after birth, shall report the same, in writing, to the health authorities of the city, borough, or township of the first class in which the case may be located; or, if it be located in a township of the second class, or a city, borough, or township of the first class, not having a board of health, or body acting as such, the State Department of Health, within six hours after the discovery thereof; giving the name of the infant, the names of the parents or guardians, and the street and number of their residence, or otherwise sufficiently designate the same; together with the fact that such inflammation or swelling or redness exists, and shall make a similar report in writing

to some regularly qualified practicing physician of the district.

Section 3. That it shall be the duty of the said health authorities or the State Department of Health, immediately upon receipt of a written report from a midwife or a nurse, or person other than a practicing physician, to notify the parents or guardian, or other person having charge of the infant, of the danger to the eyes or eye of said infant by reason of any neglect of proper treatment of the same.

Section 4. Every physician in this commonwealth who shall treat any infant's eyes for ophthalmia neonatorum (inflammation of the eyes of an infant) shall, within forty-eight hours after said physician ceases treatment of or attendance upon such case of ophthalmia neonatorum, report to the Commissioner of Health of the commonwealth of Pennsylvania that said physician has treated a certain case of ophthalmia neonatorum, giving full information as required in section one of this act, stating that he has ceased treatment of or attendance upon said case, and what was condition of infant's eyes when physician ceased treatment of or attendance upon said case of ophthalmia neonatorum.

Section 5. Every health officer shall furnish a copy of this act to every person who is known to him to act as a midwife or nurse in the city, borough, or township for which he is health officer; and the Commissioner of Health of this commonwealth of Pennsylvania shall cause a sufficient number of copies of this act to be printed and supplied to the health officers.

Section 6. Any physician, midwife, nurse, or other person who shall violate any of the provisions of this act, shall, upon conviction thereof in a summary proceeding before any justice of the peace or alderman of the county wherein such offense was committed, be sentenced to pay a fine of not less than twenty or more than one hundred (\$100) dollars, to be paid to the use of the said county, and the costs of prosecution, or to be imprisoned in the county jail for a period of not less than ten (10) or more than thirty (30) days, or both, at the discretion of the court.

Section 7. An "Act for the prevention of blindness; imposing a duty upon all midwives, nurses, or other persons having the care of infants, and also upon the health officers, and fixing penalties for neglect thereof," approved the twenty-sixth day of June, Anno Domini one thousand eight hundred and ninety-five, be and the same is hereby repealed.

IDAHO.

1913.

Should one or both eyes of an infant become inflamed or swollen or reddened, or should any pus or secretion form in the eyes or upon the edge of the lid, at any time within two weeks after birth, it shall be the duty of any midwife, nurse or other person having charge of such infant, to report, within six hours after discovery of such inflammation, redness or formation of pus or secretion, to the local health officers, or to some legally qualified practitioner of medicine in the district in which such case shall occur, the fact that such inflammation, swelling or redness or accumulation in the eye exists. Any failure to comply with the provisions of this section shall be punished by a fine of not to exceed one hundred dollars, or imprisonment not to exceed ninety days, or by both fine and imprisonment in the discretion of the court.

Law of State Board of Health.

Rule XXXIII. Any physician, midwife, nurse or other person in attendance on a confinement case, shall within two hours after the birth of a child use one of the following prophylactic treatments for the prevention of infantile blindness or ophthalmia neonatorum:

1. Two drops of a one per cent fresh solution of nitrate of silver to be dropped in each eye after the eyelids have been opened.
2. Two drops of a 25 per cent solution of argyrol or two drops of a 5 per cent solution of protargol should be dropped in each eye in the same manner as when silver nitrate is used. (Nitrate of silver is to be preferred in all cases. When argyrol or protargol are used the solution must be absolutely fresh.)

ARKANSAS.

1913.

This is a ruling of the State Board of Health, endorsed by the State Legislature:

84. Should one or both eyes of an infant become inflamed or swollen or reddened, or should any pus or secretion form in the eyes or upon the edge of the lids at any time, it shall be the duty of the midwife, nurse or other person having charge of such infant, to report, within six hours, to the local health officer, or to some legally qualified practitioner of medicine in the community in which such case shall occur the fact that such inflammation, swelling or redness or accumulation in the eyes exists.

85. It shall be the duty of said health officer or physician, immediately upon receipt of the report, to notify the parents or

person having charge of said infant of the danger to the eyes of said infant by reason of any neglect of proper treatment, and he shall give directions for the proper treatment thereof.

WISCONSIN.

1913.

For the prevention of ophthalmia neonatorum, or blindness in the newborn babe, the State Board of Health and Vital Statistics shall annually cause to be prepared and put up in proper containers a one per cent solution of nitrate of silver, and shall also prepare instruction for its use. Said containers and instructions shall be distributed by said board, free of all charges, to all local health officers within the state in quantities sufficient to enable them to, and they shall, deliver to each physician and midwife one container and one copy of the instructions. It shall be the duty of the attending physician or midwife in each confinement case to use said solution as directed in said instructions.

1. In any confinement case not attended by a physician or midwife, if one of both eyes of an infant become inflamed, swollen and red, and show an unnatural discharge at any time within two weeks after its birth, the nurse, parents or other attendant having charge of such infant shall report in writing, within six hours thereafter, to the health officer of the city, village or town in which the parents of the infant reside, the fact that such inflammation, swelling, redness, or unnatural discharge exists.

2. *Health Officer—Duty.* On receipt of such report the health officer shall immediately give to the parents or persons having charge of such infant a warning of the dangers to the eye or eyes of said infant, and a copy of the instructions prepared pursuant to section 1409a-1 of the statutes; and shall employ at the expense of the said city, village, or town, a competent physician to examine the case reported and to provide such treatment as may be prescribed by the State Board of Health and Vital Statistics in its instructions.

Section 1409a-3. *Midwife.* Any woman accustomed to attending confinement cases shall be subject to the same penalty for violation as physicians or nurses.

Section 1409a-4. *Penalty for Violation.* Any person who violates, neglects or refuses to observe the provisions of section 1409a-1, 1409a-2 or 1409a-3 shall be punished by a fine of not more than one hundred dollars for each offense.

WISCONSIN.

Proceedings of the State Board of Health, 1909.

Section 1409a-2. It shall be the duty of the attending physician, midwife, nurse or other person in attendance on a confinement case, to use such prophylactic treatment for the prevention of blindness among new-born children as the State Board of Health and Vital Statistics in its rules and regulations may deem necessary.

In compliance with chapter 59, laws of 1909, pertaining to the prevention of inflammation of the eyes and blindness of the new-born babe by a disease called ophthalmia neonatorum and specifically in compliance with section 1409a-2.

The State Board of Health of Wisconsin hereby determines that in order to prevent the development of ophthalmia neonatorum, two drops of a one per cent fresh solution of nitrate of silver should be used in each eye of every new-born babe, and we hereby, in compliance with this chapter, recommend its use.

Should one or both eyes of an infant become inflamed, swollen and red, and show an unnatural discharge at any time within two weeks after its birth, the nurse, parents, or other person having charge of such infant shall report in writing, within six hours thereafter, to the Board of Health of the city, incorporated village or town in which the parents of the infant reside, the fact that such inflammation, swelling, redness, or unnatural discharge exists. (The local health officers should supply physicians, midwives, nurses and other persons required to report cases of ophthalmia neonatorum with suitable blanks. All cases of this disease should be reported the same as scarlet fever, diphtheria or other dangerous contagious disease.)

On receipt of such report the health officer shall inform the attending physician of the conditions complained of, or if there is no physician in attendance, the health officer shall then employ, at the expense of the town, incorporated village or city, a competent physician to examine the case reported, and the physician shall provide proper treatment or such as recommended in the rules and regulations adopted by the State Board of Health and Vital Statistics.

The health officer shall immediately upon the receipt of the written report herein provided for, if no physician was in charge, notify the parents or person having charge of said infant, of the dangers to the eye, or eyes of said infant, and he shall also enclose

to the parents, or person having charge of the child, directions for the proper treatment thereof.

Section 1409a-3. Any woman accustomed to attend confinement cases shall be subject to the same penalty for violation as physicians or nurses.

Section 1409a-4. Any person who violates, neglects, or refuses to observe the provisions of this act shall be punished by a fine of not more than one hundred dollars for each offense.

At the regular semi-annual meeting of the state board of health, held on June 27, 1912, the following resolution was unanimously adopted:

"The Secretary of the board is hereby requested to instruct all local boards of health to immediately prosecute all physicians, midwives, or other persons being in charge of new born infants who fail or neglect to report any case of inflammation of the eyes, or ophthalmia neonatorum, in accordance with the law granting to the state board of health authority for enforcement as defined in Chapter 59, Laws of 1909."

The report of each birth which must be filled out and filed by the physician or midwife in attendance provides space for reporting whether or not a prophylactic was used to prevent ophthalmia neonatorum.

The new form of birth record will require the following information:

1. What preventative for ophthalmia neonatorum did you use?
2. If none, why?

These questions should be fully answered in every case.

There is in Wisconsin an appropriation of \$1,500.00 for the free distribution of nitrate of silver solution.

RHODE ISLAND.

1914.

Sec. 25. "Should any midwife or nurse, or person acting as nurse, having charge of an infant in this state, notice that one or both eyes of such infant are inflamed or has swelling or reddening of lids and an unnatural discharge or the eyes are reddened at any time within two weeks after its birth, it shall be the duty of such midwife or nurse, so having charge of such infant, to report the fact in writing within six hours to the health officer, or some qualified practitioner of medicine, of the city or town in which the parents of the infant reside. Every practitioner of medicine, attending the birth of such an infant, must treat the eyes of such infant with a prophylactic remedy for the prevention of ophthalmia neonatorum."

Sec. 26. Every health officer shall furnish a copy of this act to each person who is known to him to act as midwife or nurse in the city or town for which such health officer is appointed, and the Secretary of State shall cause a sufficient number of copies of this act to be printed, and supply the same to the health officers on application. The State Board of Health shall furnish free of cost to all persons authorized to practice medicine in this state such prophylactic remedy as it may deem best for the prevention of ophthalmia neonatorum.

Sec. 27. Every person who shall fail to comply with the provisions of this act shall be fined not exceeding one hundred dollars, or imprisoned not exceeding six months, or both.

KENTUCKY.

1914.

Whereas, trachoma and ophthalmia in the new-born, both highly infectious eye diseases, which usually result in blindness unless promptly recognized and treated, now exist in widely separated counties and sections and everywhere show a tendency to break over official control and become widespread; and,

Whereas, so large a per cent of those who now have these diseases, or who are exposed to the contagion of either of them, will become charges upon public charity as to make systematic precautions against their further spread matters of great financial as well as humanitarian importance. Now, therefore,

Be it enacted by the General Assembly of the Commonwealth of Kentucky:

1. That it shall be the duty of the County Board of Health of each county, acting in co-operation with the County Medical Society and State Board of Health, to arrange for an annual course of instruction or school for the physicians, midwives and nurses of such county to teach the importance, and the latest and best methods for the early recognition and treatment of, the dangers from, and the precaution to be used against, the infection and contagion to all who come in contact with cases of trachoma and ophthalmia or any other disease of the eyes of the new-born, or with any towel, utensil or other thing used by or for them; and the importance and imperative duty of at once reporting all cases of such diseases to the county or city health authorities, as may be, and of keeping a true record of all such cases.

2. That it shall be the duty of the State Board of Health to secure the co-operation and assistance of the national health authorities in dealing with these diseases, and to prepare and issue

bulletins or other literature containing professional and popular information as to the prevalence and infectious character of such eye diseases, and the precautions to be used against such infections; and to furnish formulae and other information for the use of physicians and midwives in the management and treatment of such diseases. It shall be the duty of the county boards of health to furnish to physicians and midwives the simple drugs to be used for the indigent in preventing and in treating such diseases.

3. That it shall be the duty of every physician and of every midwife, who, while in attendance upon a baby under thirty days old or upon its mother, has observed ophthalmia in the new-born baby, and the duty of the head of a family and of a trained nurse in a family in which there is a baby under thirty days old and no physician or midwife in attendance, and the duty of the trained nurse and of the head of any institution in which there is a baby under thirty days old and no physician or midwife in attendance upon it or its mother, to report the case of ophthalmia in the new-born within six hours after observing it to the City Board of Health, if the case shall have occurred in a city then having a City Board of Health, or if there be no City Board of Health, or if the case shall have occurred outside a city, to the County Board of Health within twenty-four hours after observation. And it shall be the duty of every physician to report each case of trachoma so diagnosed by him as attending or examining physician within five days after such diagnosis. And any physician, midwife, nurse, or head of family who fails to make the report required by this act, shall upon conviction, be fined not more than one hundred dollars; and persistent failure or refusal on the part of a physician, midwife or nurse to make such report or to take the necessary precautions to prevent the spread of such diseases shall be a proper ground for the revocation of the right to practice, after due notice and hearing, as now provided by law for the revocation of certificates to practice medicine in this commonwealth.

4. That "Ophthalmia in the New-born" shall be understood to be "any inflammation, swelling and redness of either eye, or of both eyes, either apart from or together with any unnatural discharge from the eye, or eyes, of a baby."

5. That all laws in conflict with this act are hereby repealed.

NEW YORK.

1914.

There is no actual primary legislative law in New York concerning ophthalmia neonatorum. The Public Health Council has,

however, issued certain regulations in its sanitary code, having a bearing on this subject. The regulations of the Public Health Council are endorsed by the State Legislature, and virtually become laws. In chapter II of the Sanitary Code, Ophthalmia Neonatorum is classed as a "Communicable Disease," and comes under the requirements of Regulations 2 and 3 as follows:

Regulation 2. Reporting cases of communicable disease by physicians. It shall be the duty of every physician to report to the local health officer, within whose jurisdiction such patient is, the full name, age and address of every person affected with a communicable disease, together with the name of the disease, within twenty-four hours from the time when the case is first seen by him. Such report shall be by telephone or telegram, when practicable, and shall be made in writing.

Regulation 3. Reporting cases of communicable disease in institutions. It shall be the duty of the superintendent or person in charge of every hospital, other institution, or dispensary, to report to the local health officer, within whose jurisdiction any such hospital, other institution, or dispensary is located, the full name, age and address of every person under his charge affected with a communicable disease, together with the name of the disease, within twenty-four hours from the time when the case first develops or is first admitted to such hospital, other institution, or dispensary. Such report shall be by telephone or telegram, when practicable, and shall also be made in writing.

LOUISIANA.

1914.

Section 1. Be it enacted by the General Assembly of the State of Louisiana, that any condition of the eye or eyes, of any infant shall, independent of the nature of the infection, be known as ophthalmia neonatorum, in which there is any inflammation, swelling or redness in either one or both eyes of any such infant, either apart from or together with any unnatural discharge from the eye, or eyes, of any such infant at any time within two weeks after the birth of such infant.

Duties of Physicians, Midwives, Obstetricians, Etc.

Sec. 2. Be it further enacted, etc., That it shall be the duty of any physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital of any nature, parent, relative, and any person, or persons, attendant upon, or assisting in any way whatsoever any woman at childbirth, or attendant upon, or assisting in any way whatsoever any infant, or the mother of any infant, at any

time within two weeks after childbirth, knowing the condition defined and described in Section 1 of this Act to exist, and within six hours thereafter, to report such fact, as the State Board of Health shall direct, to the local health officer of the parish, city, town, village, or whatever other political division there may be, within which the mother of any such infant may reside.

Duties of Health Officer.

Sec. 3. Be it further enacted, etc., That it shall be the duty of the local health officer:

1. To investigate each case as filed with him in pursuance with this law, and any other such case as may come to his attention.

2. To report all cases of ophthalmia neonatorum and the result of all such investigation as he shall make, as the State Board of Health shall direct.

3. To conform to such other rules and regulations as the State Board of Health shall promulgate for his further guidance.

Duties of the Louisiana State Board of Health.

Sec. 4. Be it further enacted, etc., That it shall be the duty of the Louisiana State Board of Health:

1. To enforce the provisions of this Act.

2. To promulgate such rules and regulations as shall, under this Act, be necessary for the purpose of this Act, and such as the State Board of Health may deem necessary for the further and proper guidance of local health officers, etc.

3. To provide for the gratuitous distribution of a scientific prophylactic for ophthalmia neonatorum, together with proper directions for the use and administration thereof, to all physicians, midwives and the like, as may be engaged in the practice of obstetrics or assisting at childbirth.

4. To print and publish such further advice and information concerning the danger of ophthalmia neonatorum and the necessity for prompt and effective treatment thereof, as may be deemed fit.

5. To furnish copies of this law to all physicians, midwives, and the like, as may be engaged in the practice of obstetrics, or assisting at childbirth.

6. To keep a proper record of any and all cases of ophthalmia neonatorum as shall be filed in their office in pursuance with this law, and as may come to their attention in any way, and to constitute such records a part of the annual report to the Government and the Legislature.

7. To report any and all violations of this act as may come to their attention to the prosecuting attorney for the district wherein said misdemeanor may have been committed, and to assist said official in any way possible, such as by securing necessary evidence, etc.

Duties of Maternity Homes, Hospitals, Infirmarys, Physicians, Etc.

Sec. 5. Be it further enacted, etc., That it shall be the duty of all maternity homes and all hospitals, etc., to maintain such records of cases of ophthalmia neonatorum as the State Board of Health shall direct. It shall be the duty of any and all physicians, midwives, and the like, in addition to reporting as hereinbefore enacted, to advise, prescribe and employ, in the treatment of all cases of ophthalmia neonatorum, such prophylactics as the State Board of Health shall direct.

Penalty.

Sec. 6. Be it further enacted, etc., That the failure of any and all physicians, midwives, etc., as hereinabove set forth, to report as herein prescribed, or the failure of any hospital to report as herein enacted, or the failure of any licensed physician to apply a proper scientific prophylactic, or the neglect or failure of any midwife, or the like, to apply a proper prophylactic directed and prescribed by the orders of the State Board of Health, or the Sanitary Code, in all cases of ophthalmia neonatorum, as herein prescribed, and under such circumstances as are herein set forth, or any or all of such violations, as the case may be, shall constitute a misdemeanor under this Act. Any person accused of a misdemeanor under this Act shall, upon conviction thereof, be fined, for the first offense, not to exceed \$50.00; for a second offense not to exceed \$100.00; and for a third offense and thereafter not to exceed \$200.00 for each violation; and if the accused be a physician, midwife or the like, such person shall in the discretion of the court, suffer a revocation of license, or both fine and revocation, as the court may see fit; and if the accused be a maternity home or the like, duly incorporated under the laws of the State, the court may in its discretion order a revocation of its charter, and any collusion between any official and any person, or between any others herein named, to misstate or conceal any facts which, under this Act, are essential to report correctly, shall likewise constitute a misdemeanor, and the accused shall, upon conviction, suffer a penalty such as hereinbefore enumerated and enacted. The act of his agent in the scope of his employment shall be deemed the

act of the principal. Any and all cases of ophthalmia neonatorum, or the resultant blindness therefrom, on which the accused may have been in attendance, as hereinbefore set forth, shall be taken as prima facie evidence of knowledge on the part of the accused. It shall be the duty of the State's attorney, for the proper district, to prosecute for all misdemeanors as herein prescribed.

Appropriation and Dedication of Fines for Carrying Into Effect the Provisions of This Act.

Sec. 7. Be it further enacted, etc., That the sum of five hundred dollars annually or as much thereof as may be necessary, be, and the same is hereby, set aside from, and payable out of, the general fund, upon the warrant of the president and secretary of the Louisiana State Board of Health for the use of the State Board of Health in enforcing and carrying out the provisions of this Act. Any and all necessary and legitimate expenses that may be incurred in prosecuting a case under this act shall, upon a proper showing, be met by the State Board of Health out of this appropriation. In addition thereto all fines and penalties recovered hereunder shall be paid into the State treasury and shall constitute a special fund for the uses and purposes of the State Board of Health as herein enacted.

Sec. 8. Be it further enacted, etc., That all laws, or parts of laws, in conflict herewith are hereby repealed .

OHIO.

1915.

Section 1. Any inflammation, swelling or redness in either one or both eyes of any infant, either apart from or together with any unnatural discharge from the eye or eyes of such infant, independent of the nature of the infection, if any, occurring any time within two weeks after the birth of such infant, shall be known as "inflammation of the eyes of the new-born."

Section 2. It shall be the duty of any physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital of any nature; parent, relative and any persons attendant on or assisting in any way whatsoever, any infant or the mother of any infant at childbirth or any time, within two weeks after childbirth, knowing the condition, hereinabove defined, to exist, within six hours thereafter, to report such fact, as the State Board of Health shall direct, to the local health officer of the city, town, village or whatever other political division there may be, within which the infant or the mother of any such infant may reside. For such services the

attending physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital shall receive from the State treasurer a fee of fifty cents.

Section 3. It shall be the duty of the local health officer:

1. To investigate or to have investigated, each case as filed with him in pursuance with the law, and any other such case as may come to his attention.

2. To report all cases of inflammation of the eyes of the new-born and the result of all such investigation as the State Board of Health shall direct.

3. To conform to such other rules and regulations as the State Board of Health shall promulgate for his further guidance.

Section 4. It shall be the duty of the State Board of Health:

1. To enforce the provisions of this Act.

2. To promulgate such rules and regulations as shall, under this Act, be necessary for the purpose of this Act, and such as the State Board of Health may deem necessary for the further and proper guidance of local health officers.

3. To provide for the gratuitous distribution of a scientific prophylactic for inflammation of the eyes of the new-born, together with proper directions for the use and administration thereof, to all physicians and midwives as may be engaged in the practice of obstetrics or assisting at childbirth.

4. To provide, if necessary, daily inspection and prompt and gratuitous treatment to any infant whose eyes are infected with inflammation of the eyes, provided further that the State Board of Health, if necessary, shall defray the expense of such treatment from such sum as may be appropriated for its use.

5. To publish and promulgate such further advice and information concerning the dangers of inflammation of the eyes of the new-born, and the necessity for prompt and effective treatment.

6. To furnish copies of this law to all physicians and midwives as many be engaged in the practice of obstetrics or assisting at childbirth.

7. To keep a proper record of any and all cases of inflammation of the eyes of the new-born, as shall be filed in the office of the State Board of Health, in pursuance with this law and as may come to their attention in any way, and to constitute such records a part of the annual report to the Governor and the Legislature.

8. To report any and all violations of this Act as may come to its attention, to the State Board of Medical Registration and

Examination and also to the local police or county prosecutor in the county wherein said misdemeanor may have been committed, and to assist said official in every way possible, such as by securing necessary evidence.

Section 5. It shall be the duty of physicians, midwives, or other persons in attendance upon a case of childbirth in a maternity home, hospital, public or charitable institution, in every infant immediately after birth, to use some prophylactic against inflammation of the eyes of the new-born and to make record of the prophylactic used. It shall also be the duty of such institution to maintain such records of cases of inflammation of the eyes of the new-born as the State Board of Health shall direct.

Section 6. It shall be the duty of a midwife in every case of childbirth under her care, immediately after birth, to use such prophylactic against inflammation of the eyes of the new-born as the State Board of Health requires. Whoever being a physician, surgeon, midwife, obstetrician, nurse, manager or person in charge of a maternity home or hospital, parent, relative or person attendant upon or assisting at the birth of any infant violates any of the provisions of this Act, shall be deemed guilty of a misdemeanor and upon conviction thereof be fined in a sum not less than fifty dollars nor more than one hundred dollars, and for each second or subsequent offense shall be fined not less than one hundred dollars nor more than three hundred dollars. It shall be the duty of the prosecuting attorney to prosecute all violations of this Act.

Section 8. The sum of \$5,000 shall be annually appropriated for the use of the State Board of Health in enforcing and carrying out the provisions of this Act. Any and all necessary and legitimate expenses that may be incurred in prosecuting a case under this Act shall, on proper showing, be met by the State Board of Health out of this appropriation. In addition thereto, all fines and penalties recovered hereunder shall be paid into the State treasury and shall constitute a special fund for the use and purposes of the State Board of Health as herein enacted.

Section 9. All Acts and parts of Acts, in conflict herewith, are hereby repealed.

OHIO.

Rules and Regulations of the State Board of Health for the Prevention of Blindness From Inflammation of the Eyes of the New-Born.

1. Every physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital required to report to the local health

officer the condition defined as inflammation of the eyes of the new-born, in an act entitled "An Act for the prevention of blindness from inflammation of the eyes of the new-born, designating certain powers and duties and otherwise providing for the enforcement of this act," passed May 19, 1915, shall make such report in writing. Said written report shall give the name and address of the reporting physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital, the name, sex, age in days and address of the infant afflicted with inflammation of the eyes of the new-born, together with the name of the mother of such infant, provided that in the case of an unnamed infant, so afflicted the designation "Unnamed" shall be written in lieu of a given name.

2. If, in the opinion of the reporting physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital, the conditions of the case so require, in addition to the written report, an immediate notice of such case shall be given to the health officer in the most rapid manner available.

3. Upon receipt of a written report of a case of inflammation of the eyes of the new-born, the local health officer shall immediately write on the report the date and hour of the receipt of the report together with his own signature, and shall make a permanent record of the case for the use of the local health department. The original written report shall be thereafter forwarded at once by mail to the State Department of Health.

4. Parents, relatives and other persons required to report a case of inflammation of the eyes of the new-born shall make such report to the health officer in the most rapid manner available. Each case so reported to the health officer, and any other case coming to his attention otherwise than by the written reports as provided above, shall be reported in writing to the State Department of Health by the health officer. Such report from the health officer shall give the name and address of the person who first notified the health officer of the case, or a statement as to the health officer's source of information concerning the case, together with the name, sex, age in days and address of the infant afflicted with inflammation of the eyes of the new-born and the name of the mother of such infant provided that in the case of any unnamed infant so afflicted the designation "Unnamed" shall be written in lieu of a given name.

5. The local health officer shall forward by mail to the State Department of Health on blanks provided for the purpose a report of the investigation and history of each and every case of inflam-

mation of the eyes of the new-born reported to him or coming to his attention, said report to be submitted as soon as practicable.

6. Between the first and sixth of each month, the Secretary and Executive Officer of the State Board of Health, shall certify to the Treasurer of State the name and address of every physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital from whom one or more, the number to be specified, written reports of cases of inflammation of the eyes of the new-born submitted in full compliance with statute and rules and regulations of the State Board of Health, have been received by the State Department of Health during the preceding month.

Adopted August 12, 1915. Effective August 20, 1915.

TENNESSEE.

1915.

Section 1. It shall be the duty of the State Board of Health to officially name and approve a prophylaxis (or preventive) to be used in treating the eyes of newly born children, for preventing Ophthalmia Neonatorum (or for preventing blindness); and it shall be the duty of the Board of Health to publish instructions for using the same.

Section 2. Be it further enacted, That it shall be the duty of any physician, nurse or midwife, who shall assist and be in charge at the birth of any infant, or have the care of the same after birth, to treat the eyes of the infant with a prophylaxis approved by the State Board of Health; and such treatment shall be given as soon as practicable after the birth of the infant and always within one hour; and if any redness, swelling, inflammation, or gathering of pus shall appear in the eyes of such infant or upon the lid or about the eyes within two weeks after birth, then any nurse, midwife or other person, having care of the infant shall report the same to the local health officer or some competent practicing physician within six hours after its discovery.

Section 3. Be it further enacted, That any failure to comply with the provisions of Section 2 of this Act shall be a misdemeanor, punishable, upon indictment and conviction, by a fine of not less than five dollars nor more than \$100, or imprisonment in the County Jail not to exceed six months, or both in the discretion of the court.

Proceedings of the Tennessee State Board of Health.

In compliance with the mandatory instructions of the above law the Tennessee State Board of Health officially names and

approves a 15 per cent solution of argyrol or a 1 per cent solution of nitrate of silver as a prophylaxis for *Ophthalmia neonatorum*.

CALIFORNIA.

1915.

Section 1. Any condition of the eye, or eyes, of any infant in which there is any inflammation, swelling, or redness in either one or both of eyes of any such infant, either apart from or together with any unnatural discharge from the eye, or eyes, of any such infant, at any time within two weeks after its birth, shall, independent of the nature of the infection, for the purpose of this act, be called *ophthalmia neonatorum*.

Sec. 2. It shall be the duty of any physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital of any nature, parent, relative and any person or persons attendant upon, or assisting in any way whatsoever, either the mother or child, or both, at childbirth, in all cases where such child shall develop within two weeks after its birth *ophthalmia neonatorum*, and such person shall know the same to exist, to report the case within twenty-four hours after knowledge of the same, in such form as the State Board of Health shall direct, to the local health officer of the county or municipality within which the mother of any such infant may reside.

Sec. 3. It shall be the duty of the local health officer:

1. To investigate each case as shall be filed with him in pursuance with this Act, and all other such cases as may come to his attention.

2. To report all cases of *ophthalmia neonatorum* coming to his knowledge, and the result of all such investigations as he shall make to the State Board of Health, in such form as said board shall direct.

3. To conform to such rules and regulations as the State Board of Health shall promulgate for the purpose of carrying out the provisions of this Act.

Sec. 4. It shall be the duty of the State Board of Health:

1. To enforce the provisions of this Act.

2. To promulgate such rules and regulations as the State Board of Health may deem necessary to properly carry out the provisions hereof.

3. To provide for the gratuitous distribution of a scientific prophylactic for *ophthalmia neonatorum*, together with proper directions for the use and administration thereof, to all physicians.

midwives and such other persons as may be lawfully engaged in the practice of obstetrics or assisting at childbirths.

4. To print and publish such further advice and information concerning the dangers of ophthalmia neonatorum and the necessity for prompt and effective treatment thereof, as said board may deem necessary.

5. To furnish without cost copies of this law to all physicians, midwives and such other persons as may be lawfully engaged in the practice of obstetrics or assisting at childbirths.

6. To keep a proper record of any and all cases of ophthalmia neonatorum as shall be filed in their office in pursuance with this law, and as may come to their attention in any way, and to constitute such records a part of the biennial report to the Governor and the Legislature.

7. To report any and all violations of this Act as may come to their attention to the district attorney of the district wherein any violation of any provision of this Act may have been committed, for the purpose of prosecution.

Sec. 5. It shall be the duty of all maternity homes, hospitals, and similar institutions wherein childbirths shall occur, to keep a record of all cases of ophthalmia neonatorum occurring or discovered therein. Such records shall be in the form and contain the matters which the State Board of Health shall prescribe.

Sec. 6. The failure of any person mentioned in section 2 hereof to report, or the failure of any maternity home, hospital, or similar institution, to record any and all cases of ophthalmia neonatorum, as herein directed, or the failure or refusal of any person or institution, herein mentioned, to obey any rule or regulation adopted by the State Board of Health under this Act, shall constitute a misdemeanor, and upon conviction thereof shall be fined, for the first offense not to exceed fifty dollars; for a second offense not to exceed one hundred dollars; and for a third offense, and thereafter not to exceed two hundred dollars for each violation; and after the third conviction, if the person be a physician, midwife, or other person professionally employed, such conviction shall be a sufficient cause for the revocation of the license of such person by the board which granted the same. One-half of all fines collected hereunder shall go to the county wherein the prosecution was had, and the remaining one-half thereof shall go into the State treasury and constitute a special fund to be expended by the State Board of Health for the purposes of carrying out the provisions

of this Act. Any case of ophthalmia neonatorum, or the resultant blindness therefrom, upon which the accused may have been in attendance as hereinbefore set forth, shall be *prima facie* evidence of knowledge of such case by the accused.

Sec. 7. Chapter XIV, Statutes of 1897, entitled "An Act to regulate medical practice, to prevent blindness in infants," approved February 17, 1897, and all other acts and parts of acts in conflict herewith, are hereby repealed.

NEW HAMPSHIRE.

1915.

Section 1. Should one or both eyes of an infant become inflamed, swollen, and red, and show an unusual discharge at any time within two weeks after its birth, it shall be the duty of the attending midwife, nurse, relative, or other attendant treating or having charge of such infant, to report in writing, within six hours thereafter, to the Board of Health of the city or town in which the parents of the infant reside, the fact that such inflammation, swelling, and redness of the eyes and unnatural discharge exist, except that if a legally qualified physician is in attendance, he shall report as required by this section within twenty-four hours.

Sec. 2. Upon receipt of a report as set forth in section 1 of this Act, the Board of Health, if no physician is in attendance, shall at once direct the parents, or whoever has charge of such infant having such inflammation, swelling, redness, or unnatural discharge of the eyes, immediately to place it in charge of a legally qualified physician, or in charge of the city or town physician if unable to pay for medical services.

Sec. 3. The Board of Health of every city and town in the State shall make a weekly report to the State Board of Health, upon blanks furnished for that purpose, of all cases reported under the provisions of section 1 of this Act, and the State Board of Health is authorized to adopt such rules, regulations and instructions as it may deem necessary to carry out the provisions of this Act.

Sec. 4. Any person violating the provisions of this Act shall be deemed guilty of a misdemeanor, and shall be fined not exceeding twenty-five dollars for each offense.

NORTH CAROLINA.

1915.

The General Assembly of North Carolina do enact:

Section 1. That it shall be unlawful for any physician to neglect or otherwise fail to instill or have instilled, immediately upon its

birth, in the eyes of the new-born babe a suitable amount of a 1 per cent solution of nitrate of silver.

Sec. 2. Should any midwife or nurse, or person acting as nurse, having charge of an infant in this State, notice that one or both eyes of such infant are inflamed or reddened at any time within two weeks after its birth, it shall be the duty of such midwife or nurse, or person acting as nurse, so having charge of such infant, to report the fact in writing within six hours to the health officer, or some qualified practitioner of medicine, of the city or town in which the parents of the infant reside.

Sec. 3. Every health officer shall furnish a copy of this Act to each person who is known to him to act as midwife or nurse in the city or town for which such health officer is appointed, and the Secretary of State shall cause a sufficient number of copies of this Act to be printed, and supply the same to the health officers and State Board of Health on application.

Sec. 4. Any person violating this Act shall be guilty of a misdemeanor, and upon conviction shall be fined not less than five dollars (\$5) nor more than ten dollars (\$10).

Sec. 5. That this Act shall be in force from and after its ratification.

OREGON.

1915.

Section 1. Should one or both eyes of an infant become inflamed or swollen or reddened at any time within two weeks after birth, it shall be the duty of the midwife or nurse, or other person having the care of such infant, to report in writing within twenty-four hours after the discovery thereof, to the health officer or legally qualified practitioner of the city, town or district in which the mother of the child resides, the fact that such inflammation or swelling or redness exists.

Sec. 2. That it shall be the duty of said health officer, immediately upon receipt of said written report, to notify the parents or the person having charge of said infant of the danger to the eye or eyes of said infant by reason of said condition from neglect of proper treatment of the same, and he shall also enclose to them directions for the proper treatment thereof.

Sec. 3. Every health officer shall furnish a copy of this Act to each person who is known to him to act as midwife or nurse in the city or town for which such health officer is appointed, and the State Board of Health shall cause a sufficient number of copies

of this Act to be printed and supply the same to such health officer on application.

Sec. 4. Any failure to comply with the provisions of this Act shall be punishable by fine of \$25.00 to \$100.00 or imprisonment not to exceed thirty days, or both.

NEBRASKA.

1915.

Section 1. *Physicians—To Use Nitrate of Silver on Eyes of New-Born Babies.* It shall be the duty of every physician in attendance upon any lying-in women, either in hospital or the general practice, upon the delivery of any newly born child, to use in the eyes of said child one of the following preparations:

Nitrate of silver, 1% to 4% solution.

Protaragol, 10% to 40% solution.

Argyrol, 40% to 50% solution.

No additional fee shall be charged by any physician for the furnishing or use of the preparations herein prescribed.

Sec. 2. *Penalty for Failure to Use.* Any physician violating the provisions of this Act shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined in any sum not less than ten dollars nor more than fifty dollars, and his physician's license shall be subject to revocation by the State Board of Health.

ILLINOIS.

1915.

Section 1. Be it enacted by the people of the State of Illinois represented in the General Assembly: That any diseased condition of the eye or eyes of any infant in which there is any inflammation, swelling or redness in either one or both eyes of any such infant, either apart from or together with any unnatural discharge from the eye, or eyes of such infant, at any time within two weeks after the birth of such infant, shall, independent of the nature of the infection, be known as ophthalmia neonatorum.

Sec. 2. It shall be the duty of any physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital, of any nature, or parent, assisting in any way whatsoever, any woman at childbirth, or assisting in any way whatsoever any infant, or the mother of any infant, at any time within two weeks after childbirth, observing or having a reasonable opportunity to observe the condition herein defined, and within six hours thereafter to report in writing or by telephone, followed by a written report, such fact to the local health authorities of the city, town, village or other political

division, as the case may be, in which the mother of any such infant may reside. Provided, that such reports and the records thereof shall be deemed privileged information and shall not be open to the public.

Sec. 3. It shall be the duty of all maternity homes and any and all hospitals or places where women resort for purposes of childbirth, to post and keep posted in conspicuous places in their institution, copies of this Act, and to instruct persons professionally employed in such homes, hospitals and places regarding their duties under this Act, and to maintain such records of cases of ophthalmia neonatorum in the manner and form prescribed by the State Board of Health.

It shall be the duty of any and all physicians and midwives to advise, or for the prevention of ophthalmia neonatorum, such prophylactic as shall be prescribed by the State Board of Health, and to inform the parents or guardians of a child as to the dangers and dire consequences of this disease, for the purpose of preventing the development of ophthalmia neonatorum in cases of childbirth attended by midwives, midwives may employ the prophylactic prescribed by the State Board of Health, provided the consent of the parent or parents or guardian shall first be obtained for the use of such preventive treatment.

Sec. 4. It shall be the duty of the local health officer:

1. To investigate, in so far as that can be done without entering into the home or interfering with the child in any way without first securing the consent of the parents or guardian of such child, and each case of ophthalmia neonatorum reported to him in compliance with this law, and any other such case as may come to his attention.

2. To report all cases of ophthalmia neonatorum and the results of all such investigations as he may make to the State Board of Health in the manner and form prescribed by said board.

Sec. 5. It shall be the duty of the State Board of Health:

1. To enforce the provisions of this Act.
2. To provide for the gratuitous distribution of a scientific prophylactic for ophthalmia neonatorum, together with proper directions for the use and administration thereof, to all physicians and midwives authorized by law to attend at the birth of any child.
3. To have printed and published for distribution throughout the State advice and information concerning the dangers of oph-

themia neonatorum and the necessity for the prompt and effective treatment thereof.

4. To furnish similar advice and information, together with copies of this law, to all physicians, midwives and others authorized by law to attend at the birth of any child.

5. To prepare appropriate report blanks and to furnish same to all local health officers for distribution to physicians and midwives free of charge.

6. To report any and all violations of this Act to the prosecuting attorney of the district wherein said violation may have been committed.

Sec. 6. Any collusion between any official and any person, or between any others herein named, to misstate or conceal any facts which under this Act are essential to report correctly any case of ophthalmia neonatorum, shall likewise constitute a misdemeanor, and any person upon conviction thereof shall suffer a penalty such as is hereinafter provided.

Sec. 7. It shall be the duty of the State's Attorney for the proper district to prosecute for all misdemeanors as herein prescribed.

Sec. 8. Any person violating any of the provisions of this Act shall be guilty of a misdemeanor and shall, upon conviction thereof, be fined not less than ten (\$10) dollars nor more than one hundred (\$100) dollars, in the discretion of the court.

Sec. 9. An Act for the prevention of blindness, approved June 21, 1895, in force July 1, 1895, is hereby repealed.

ANALYSIS OF THE LAWS.

States where Ophthalmia Neonatorum laws have been primarily passed by the Legislature:

- | | |
|------------------|--------------------|
| 1. New Jersey | 13. Rhode Island |
| 2. Missouri | 14. Kentucky |
| 3. Iowa | 15. Louisiana |
| 4. Connecticut | 16. Ohio |
| 5. Maryland | 17. Tennessee |
| 6. Massachusetts | 18. California |
| 7. Vermont | 19. New Hampshire |
| 8. North Dakota | 20. North Carolina |
| 9. Indiana | 21. Oregon |
| 10. Michigan | 22. Nebraska |
| 11. Pennsylvania | 23. Illinois |
| 12. Wisconsin | 24. Maine |

States where a State Board of Health law has become a State law, through the Legislature endorsing the action of the State Board of Health:

South Carolina	Idaho
Utah	Arkansas
Texas	New York
Minnesota	Vermont
	Wisconsin

The District of Columbia is governed by a Board of Commissioners. They make laws for the District. They have passed a law concerning Ophthalmia Neonatorum.

States where Board of Health rules have been passed, but where the State Legislature has taken no action:

Kansas	South Dakota	Washington
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States where the time is specifically designated, during which time inflammation of the eyes, of any nature whatsoever occurring in newly born infants, must be reported:

New Jersey	2 weeks
Iowa	2 weeks
South Carolina	Any time
Maine	4 weeks
Missouri	3 weeks
Connecticut	2 weeks
Massachusetts	2 weeks
Vermont	2 weeks
Washington, D. C.	Indefinite
North Dakota	2 weeks
Utah	Indefinite
Indiana	2 weeks
Texas	Indefinite
Minnesota	2 weeks
Michigan	2 weeks
Pennsylvania	2 weeks
Idaho	2 weeks
Arkansas	Indefinite
Wisconsin	2 weeks
Rhode Island	2 weeks
Kentucky	2 weeks
New York	Indefinite
Louisiana	2 weeks
Ohio	2 weeks
Tennessee	2 weeks

California	2 weeks
New Hampshire	Indefinite
North Carolina	2 weeks
Oregon	2 weeks
Illinois	2 weeks

It will be observed that these States provide a wide latitude of time for the inception of disease. True Ophthalmia Neonatorum develops within a few hours after birth, but in most of the States this time is greatly extended (to 2 weeks for instance) in order to provide against any possible mistakes or misconstructions. In a few of the States the law even goes so far as to specify that any eye inflammation, or discharge, occurring within (let us say) two weeks after birth, shall be regarded as Ophthalmia Neonatorum. The law recognizes that a large proportion of births are attended by midwives, or friends of more or less ignorance, and deems it wise to make provisions that take into consideration the ignorant environment of many births.

The law in most States makes entirely different requirements if the woman is attended in confinement by a doctor, or by a midwife, nurse or some one else. For instance, in New Jersey the law requires that any eye inflammation or discharge, occurring in two weeks after birth, in a case unattended by a doctor, must be reported in six hours to the local health officer in writing. Essentially the same regulation is true in Iowa, Maine, Vermont, Connecticut, Massachusetts, District of Columbia, North Dakota, Utah, Indiana, Pennsylvania (must report also to a doctor), Idaho (must report also to a doctor), Arkansas (must report also to a doctor), Wisconsin, Rhode Island (must report also to a doctor), Tennessee, New Hampshire, North Carolina (must report also to a doctor), Oregon (24 hours, may report to a doctor). In South Carolina, the midwife, nurse, or anybody having in charge the confinement, who notices sore eyes in a newly born infant, must report the matter to a reputable *doctor*. The same is essentially true in Iowa, Connecticut, Texas (in 12 hours, instead of 6 hours), Michigan, Arkansas, Rhode Island and Oregon. Some of the above States allow the report to be made to the local health officer or to a reputable doctor. In most of these States the parents, guardians, etc., must be notified of the dangerous character of the disease. In Massachusetts the law requires not only midwives, nurses, etc., to report sore eyes, but also doctors must do the same. The doctor must report the case in 24 hours to the local health officer. Essentially the same is true in Utah, only

the doctor must report in 6 hours, Minnesota (12 hours), Pennsylvania, Kentucky, Vermont (6 hours), Louisiana (6 hours), Ohio (6 hours), California (24 hours, also hospitals, maternity homes, etc.), New Hampshire (24 hours), Illinois (6 hours, also hospitals, maternity homes, etc.). New York merely declares *Ophthalmia Neonatorum* to be a communicable disease, which must be reported by a doctor to the local health officer in writing. Hospitals, etc., must also report this disease.

The following States furnish free medicine upon application. Some give the prophylactic to doctors only, and some furnish it to both doctors and midwives. Printed instructions, warnings of danger, literature, advice, copies of the law, etc., accompany the outfits:

New Jersey	Ohio
Massachusetts	California
Utah	Illinois
Vermont	District of Columbia
Wisconsin	Kansas
Rhode Island	New York
Kentucky	Washington
Louisiana	Vermont

In the following States the use of a prophylactic immediately after birth, by a *doctor*, is compulsory:

Michigan	Ohio
Idaho	Tennessee
Wisconsin	North Carolina
Rhode Island	Nebraska

As modifications from this requirement, the following instructions should be noticed. In New Jersey, the local health officer is directed to immediately call a private or public doctor, when redness, etc., of a newly born child is discovered. The same is true in

North Dakota	District of Columbia
Wisconsin	Minnesota
New Hampshire	Pennsylvania
Indiana	South Carolina
Arkansas	South Dakota
Massachusetts	Utah
Kentucky	Ohio

In Maryland *only* doctors are allowed to use the prophylactic. The same is true in the District of Columbia and Nebraska.

In North Dakota the law reads that a prophylactic must be applied if there is any suspicion of diseased eyes in newly born children. It does not state who shall use the prophylactic, but it may be assumed that this must be done by anybody who has charge of the case. The same is practically true in Indiana.

In Utah the law says that doctors or midwives are to treat cases in accordance with the rules laid down by the State Board of Health. The latter organization directs that midwives shall not treat such cases, if a doctor is available. If, however, a doctor cannot be obtained the midwife is specifically instructed how to care for and treat such cases.

In Michigan the law requires that any doctor, *midwife* or *nurse* attending a case of confinement *shall* use a prophylactic immediately after birth. The same is true in

Idaho	Louisiana
Wisconsin	Nebraska
Ohio	Rhode Island
Tennessee	Ohio
Indiana	

In Illinois, doctors and midwives shall *advise* a prophylactic at birth, as advised by the State Board of Health. Midwives may use the prophylactic, provided the parents consent.

In Louisiana, doctors and midwives must employ a prophylactic in all cases of Ophthalmia Neonatorum, as the State Board of Health shall direct. It does not, however, state that the prophylactic shall be used to *prevent* disease, although this may have been the meaning of those who formed the law.

Ohio directs that all cases of Ophthalmia Neonatorum occurring in indigent families shall be daily treated at public expense as long as the appropriation is not exhausted.

The prophylactic recommended by the various States varies. Some States merely recommend that *a* prophylactic be used; others, direct that the prophylactic recommended by the State Board of Health be used, etc.

The following States recommend or require the use of certain specified drugs:

Vermont, 1 per cent nitrate of silver.

Utah, 20 per cent argyrol.

Idaho, 1 per cent nitrate of silver, 25 per cent argyrol, 5 per cent protargol.

Wisconsin, 1 per cent nitrate of silver.

Michigan, 2 per cent.

Nebraska, 1 to 4 per cent nitrate of silver, 10 to 40 per cent protargol, 40 to 50 per cent argyrol.

(Nebraska is evidently a forceful State, and it is to be hoped that the "cure is not worse than the disease." These solutions are altogether too strong, especially the 4 per cent solution of nitrate of silver. This may be sufficient to blind an eye, unless immediately washed off with a salt solution, and nothing of this kind is mentioned in the law.)

The punishment for not obeying the law varies in the different States. In New Jersey, for instance, the fine must not exceed \$200, or imprisonment not to exceed 6 months, or both. In Iowa, the fine is from \$25 to \$100, or imprisonment for not to exceed 30 days, or both. South Carolina, not to exceed \$25, or imprisonment not to exceed one month, or both. This is not in force in towns of less than 1,000 inhabitants. Connecticut, not to exceed \$200. Maryland, not to exceed \$200, or imprisonment not to exceed 6 months, or both. Massachusetts, not less than \$50 or more than \$200. Vermont, \$10. District of Columbia, not to exceed \$40. North Dakota, \$10 to \$50. Utah, constitutes a misdemeanor. Indiana, \$10 to \$50. Michigan, not to exceed \$100, or imprisonment not to exceed 6 months or both. Pennsylvania, \$20 to \$100, or imprisonment from 10 to 30 days, or both. Idaho, not to exceed \$100, or imprisonment not to exceed 90 days, or both. Wisconsin, not more than \$100 for such offense. Rhode Island, not to exceed \$100, or imprisonment not to exceed 6 months, or both. Kentucky, not more than \$100. Persistent refusal to obey the law, by a doctor, midwife or nurse, may result in revoking the license to practice. Louisiana, first offense, not more than \$50; second, not more than \$100; third, not more than \$200, or the license to practice may be revoked. Ohio, \$50 to \$100; second and other offenses, \$100 to \$300. Fines are to be used to assist the campaign against *Ophthalmia Neonatorum*. Tennessee, \$5 to \$100, or imprisonment for not more than 6 months, or both. California, first offense, not more than \$50; second, not more than \$100; third, not more than \$200; after third offense, the license may be revoked. One-half of the fines shall go to the county and one-half to a fund to assist the campaign against *Ophthalmia Neonatorum*. New Hampshire, not to exceed \$25 for each offense. North Carolina, \$5 to \$10. Oregon, \$25 to \$100, or imprisonment for not more than 30 days, or both. Nebraska, \$10 to \$50. License may be revoked. Illinois, \$10 to \$100. In North Dakota, doctors' bills for confinement are not col-

lectible unless the law concerning Ophthalmia Neonatorum has been observed. This is also true in Indiana. Maine, not to exceed \$100, or imprisonment not to exceed 6 months.

The following States send, through local Boards of Health, copies of laws, literature on the subject, instructions and warnings to doctors, midwives, nurses, parents, etc. This printed matter is intended for free distribution to doctors, midwives, nurses, parents, etc.:

New Jersey	North Carolina
Michigan	Oregon
District of Columbia	Connecticut
Florida	New Hampshire
Georgia	New York
Indiana	Ohio
Kansas	Pennsylvania
Maine	Rhode Island
Massachusetts	Tennessee
Minnesota	West Virginia
Missouri	Wisconsin

The following States have made appropriations for the campaign against Ophthalmia Neonatorum:

New Jersey, \$2,000 annually. Louisiana, \$500 annually.

Massachusetts, \$2,500 annually. Ohio, \$5,000 annually.

Wisconsin, \$1,500 annually.

In Kentucky, all County Boards of Health must hold annual courses of instruction for doctors, midwives and nurses, during which Ophthalmia Neonatorum shall be thoroughly discussed.

In the following States cases of Ophthalmia Neonatorum must be reported in writing to the local health officer. He must investigate cases and report in writing to the State Board of Health. This body must report to the Governor and the Legislature. The Boards of Health and the Prosecuting Attorney must see that the law is observed:

Utah	Ohio
Louisiana	Illinois
California	Wisconsin

In the following States, upon the birth report to the local health officer, made out by the doctor, midwife, etc., attending the confinement, will be found an inquiry as to whether a prophylactic was used at birth. An answer to this question is expected:

North Dakota	Minnesota
Indiana	New Jersey
Ohio	New York
Arizona	Oklahoma
District of Columbia	Wisconsin
Michigan	

In the following States, hospitals, maternity homes, etc., are subject to the same rules as surround confinements in private homes, and licenses may be revoked if the law is not obeyed:

Louisiana	California
Ohio	Illinois

In the following States births are reportable. The time within which reports must be made is also given:

Arizona, 5 days.	Nebraska, 3 days.
Arkansas, 10 days.	Nevada, 10 days.
California, 5 days.	New Hampshire, 6 days.
Colorado, 10 days.	New Jersey, 5 days.
Connecticut, first week of each month.	New Mexico, 30 days.
Delaware, 24 hours.	New York, 5 days.
District of Columbia, 3 days.	North Carolina, 10 days.
Florida, soon as possible.	North Dakota, 3 days.
Georgia, 10 days.	Ohio, 10 days.
Idaho, 10 days.	Oklahoma, 3 days.
Illinois.	Oregon, monthly.
Indiana, 36 hours.	Pennsylvania, 10 days.
Iowa.	Rhode Island, by 5th day of following month.
Kansas, 10 days.	South Carolina, 10 days.
Kentucky, 10 days.	South Dakota.
Louisiana, 8 days.	Tennessee.
Maine, at once.	Texas.
Maryland, 4 days.	Utah, 10 days.
Massachusetts, 48 hours.	Vermont, 10 days.
Michigan, 10 days.	Virginia, 10 days.
Minnesota, 10 days.	Washington, 10 days.
Mississippi, 10 days.	West Virginia, 30 days.
Missouri, 10 days.	Wisconsin, 5 days.
Montana, 10 days.	Wyoming, 10 days.

It is certainly evident that if there is any connection between birth reporting and relief for *Ophthalmia Neonatorum*, very few States manifest it, by the time limit of reporting of births. If

anything is to be done about "babies' sore eyes" it must be done promptly upon its appearance. In 10 days, or 20 days, or 30 days, the time for useful action will have passed, and a life of blindness may have begun. The intelligent and honest reporting of births can have a distinct influence in the campaign for preventing blindness. If the report is made in three days, the reporter can have an opportunity of not only saying whether a prophylactic has been used, and which one, but he (or she) can tell if the baby has red eyes, in which event the matter should come under the immediate investigation and action of the local health officer. There is, therefore, a chance for much revision of existing laws. Some of the States require a doctor to report births, while in others the burden is thrown upon doctors, midwives, nurses and parents.

Miss Carolyn C. Van Blarcom of the National Committee for the Prevention of Blindness, New York City, has kindly furnished me with the following tables giving some interesting figures concerning the blind in our blind schools:

*Proportion of Pupils Blind From Ophthalmia Neonatorum in
Thirty State Schools for the Blind, 1914-1915.*

	Total Pupils 1914-1915	Total Blind from O.N.	Per Cent.	New Admis'sions	New Pupils Blind from O.N.	Per Cent.
Alabama	89	19	21.3
Arkansas	123	8	6.5	20	1	5.0
California	93	16	17.2	23	4	17.3
Colorado	38	15	39.2	7	1	14.2
Connecticut	46	10	21.7	6	0	0.0
Idaho	18	3	16.6	6	1	16.6
Illinois	210	52	24.7	44	11	25.0
Indiana	133	4	3.0	23	1	4.3
Iowa	133	35	26.3	24	5	20.8
Kansas	95	22	23.1	20	2	10.0
Kentucky	124	34	27.4	29	7	24.1
Louisiana	52	8	15.3	14	2	14.2
Maryland	118	24	20.3	19	3	15.7
Massachusetts	306	79	25.8	54	5	9.2
Missouri	118	21	17.7	20	0	0.0
Montana	16	3	18.7	3	0	0.0
Nebraska	58	16	33.3	12	4	33.3
New York*	178	47	26.4	34	6	17.6
North Carolina	347	58	16.7	91	10	10.9
North Dakota	26	6	23.0	4	2	50.0

Ohio	248	66	26.6	48	7	14.5
Oklahoma	90	20	22.2	15	6	40.0
Oregon	36	10	27.7
Pennsylvania	230	78	33.9	26	6	23.0
W. Pennsylvania	131	35	26.7	13	1	7.6
South Dakota.....	28	3	10.7	2	1	50.0
Utah	34	6	17.6	3	0	0.0
Vermont	5	0	0.0	0	0	0.0
Virginia	79	5	6.3	13	1	7.6
Wisconsin	132	37	28.0	29	4	13.7
Totals	3,334	740	22.1	602	91	15.1

*Except New York City.

Proportion of Pupils in Schools for the Blind During the Past Five Years Who Are Blind From Ophthalmia Neonatorum.

School Year	No. of Schools	Total Pupils	Pupils Blind	Per Cent
1910-11.....	16	2,018	521	25.8
1911-12.....	23	2,400	567	23.6
1912-13.....	21	2,327	684	29.3
1913-14.....	19	2,496	622	24.9
1914-15.....	30	3,334	740	22.1

Proportion of Pupils Newly Admitted to Schools for the Blind, During the Past Eight Years, Who Are Blind From Ophthalmia Neonatorum.

School Year	No. of Schools	Total New Admissions	Pupils Blind From O. N.	Per Cent
1907-8.....	10	290	77	26.5
1908-9.....	14	300	68	22.6
1909-10.....	14	561	81	14.4
1910-11.....	15	351	84	23.9
1911-12.....	24	415	88	21.2
1912-13.....	21	386	88	22.7
1913-14.....	19	428	84	19.6
1914-15.....	28	602	91	15.1

Before closing this paper, I beg leave to enumerate those States that have, at least so far as I have been able to discover, no laws upon their statute books concerning Ophthalmia Neonatorum:

1. Virginia
2. Arizona
3. Florida
4. Delaware

- | | |
|-----------------|-------------------|
| 5. Kansas | 12. Nevada |
| 6. South Dakota | 13. West Virginia |
| 7. Wyoming | 14. Montana |
| 8. Oklahoma | 15. Washington |
| 9. Alabama | 16. Colorado |
| 10. Mississippi | 17. New Mexico |
| 11. Georgia | |

I would earnestly urge the States just enumerated, where no Ophthalmia Neonatorum laws exist, at least so far as I have been able to ascertain, to see that suitable laws are immediately passed. As I have said before, however, I am well aware of the fact that laws alone will not produce reforms; but laws should be passed, in order to have a foundation upon which reforms may be built.

7 W. Madison St.

NOTE ON THE USE OF IODINE IN DISEASES OF THE EYE.

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[Read before the Ear, Eye, Nose and Throat Section of the New York State Medical Society, Buffalo, N. Y., June, 1915.]

The following notes constitute a continuation of observations begun six or seven years ago on the use of iodine in diseases of the eye. OPTHALMOLOGY for April, 1910, contains a report of five cases of ocular tuberculosis, treated by the writer with iodoform, the first of these giving an unsatisfactory result because treatment was discontinued too soon. A further experience of five years, of a modified form of this treatment, has given many satisfactory results in an extended variety of cases. For obvious reasons the repeated injection of iodoform into the anterior chamber is inadmissible, and as the hypodermic use of the drug is both unpleasant and troublesome, it has been abandoned in favor of a 2½ per cent solution of iodine in fatty combination. Ten minims of this is given once or twice a week, according to the severity of the case, with a hypodermic, the flank being the usual site of injection, but this can, of course, be varied.

The main reason for using this method is that it gives better results than are obtainable by ordinary means, and gives them more promptly. In addition it is easily administered, inexpensive, and can be used in conjunction with nearly all recognized forms of treatment, so that the charge that it interferes in this respect is not well founded. Continued use of the drug for long periods does not cause iodism and is well borne.

The use of iodine is indicated in that large class of cases in which we are dealing with the distant result of infection, mixed or otherwise, in which there is no recognizable causal focus which can be dealt with, as in some cases of iritis.

Naturally, where any accessible site of septic absorption can be established it should be treated locally. In one case of obstinate recurring corneal ulceration, which was regarded as tuberculous, treatment of the bladder, T. B. having been demonstrated in the urine, was followed by prompt disappearance of all eye symptoms.

As the range of cases in which iodine has been employed with good results is an extended one, its effects can not be regarded as "specific," and we shall have to fall back for the present on the

old term "alterative" to interpret its action. It undoubtedly causes absorption of inflammatory exudate, and probably by raising the resisting power of the serum enables the system to rid itself of micro-organisms which seem to be released from the tissues by its resolvent properties.

Iodine has been employed principally in severe cases of a phlyctenoid type, many of which are indistinguishable from those which, clinically, are diagnosed as tuberculous. The action in these cases is prompt and beneficial, and accompanied by a remarkable diminution in size of the swollen cervical glands generally present. In several instances masses of inflammatory tissue of the size of a fist have resolved, the glands becoming normal in size after a few months' treatment. Most of these cases have been treated as outdoor patients. A certain number, however, do not make satisfactory progress until removed from their home environment.

Cases of recurring ulceration which are accompanied by ciliary injection, and do not respond well to local treatment, do well when treated constitutionally with iodine, the irritation disappearing promptly and apparently permanently.

In interstitial and deep keratitis, pain and photophobia disappear relatively quickly, and although the rate of absorption in established cases does not seem to be materially accelerated, the formation of dense opacities is largely prevented. One recent case of the first variety, formerly treated with 606, does not seem to have benefited by the treatment, but a supplementary course of 606 has caused the disappearance of all acute symptoms, leaving the cornea unusually clear.

In iritis of the ordinary septic type the effect is striking, the severe pain disappearing in practically every case, even when the disease is well established, within the week, and recovery is prompt, usually without the exacerbations which ordinarily are so frequent.

The injection of iodine in scleritis is also satisfactory; barring surgical interference, it is difficult to act directly upon the lesion in these cases, and the use of subconjunctival injections is apt to cause severe pain. Acting through the circulation as it does, iodine is carried into the affected tissue, exerts a powerful curative influence upon the disease and prevents the recurrence which is so characteristic.

There are several cases of chorioiditis among those recorded. One was treated with iodine alone; one with 606, although the patient, a druggist, had been giving himself iodide of potash for a number of years; a third case was treated with iodine, followed

by 606. All gave very satisfactory results, although in the last case, before using 606, the sight had begun to deteriorate again, but was restored with the latter remedy. The improvement has been maintained in all three, for from one to three years. These statements are, of course, somewhat contradictory, but from the action of iodine in improving nutrition, both by correcting faulty vascular conditions, and by prevention and removal of direct pressure on the nerve fibre, from exudate and consequent connective tissue formation, it is doubtless a valuable adjuvant. In syphilitic cases the writer has not cared to employ iodine concurrently with arsenical preparations, as there is some danger of the formation of simple and highly poisonous arsenical ions.

Iodine has been tried in a number of cases of chorioiditis and optic atrophy of many years' standing, in an endeavor to maintain the remaining vision. The results in a few instances have been encouraging. One case of optic atrophy has shown marked improvement, 6/36 to 6/9, and this has remained for more than a year. In this instance as in the case of chorioiditis given above, 606 had to be used, as deterioration of vision threatened. In another case, one of extensive chorioiditis, vision improved from 3/60 to 6/18, and had not become worse when the patient was last tested. In these cases, as in practically all of the others, a marked improvement in the general condition of the patient is manifest. It is to be noted that the increased vision was, with one exception, obtained by the use of iodine. It is also evident that if the syphilitic infection is still active, anti-specific treatment will be necessary to obviate subsequent deterioration of vision.

Two instances of untoward results are among the cases recorded. The first, a woman of about seventy years of age, who was sent in for iritis of about three months' standing, developed suddenly diabetes, the sugar content rising rapidly to about 6 per cent. The patient died the following week. Unfortunately there was no post mortem. In the second case, also diabetic, a spot of dry gangrene developed at the site of an injection: the patient had had another injection which gave no trouble, and the fact that the second one was given near the waist band, being subjected to friction, had probably some bearing on the result.

The writer is convinced that a systematic trial of the method outlined above will not prove disappointing: as its effects are systemic, its use can be extended largely. It has the advantage of attacking in many cases the underlying cause, of which the apparent lesion is only a manifestation, and of influencing favorably

disease in the interior of the eye, which is largely inaccessible to ordinary remedies.

It is only by comparing the effect of a drug in a large number of cases that any definite idea of its value and limitations can be obtained; and the action of iodine is certainly sufficiently powerful to justify an attempt to transform its use from an empirical to a rational basis; especially so, as it is so often administered combined with an alkaline base, excreted largely unchanged, and its effect almost completely lost. In these notes the subject has been treated from a general, rather than from a detailed or statistical standpoints, and with the view of determining the limitations of the treatment a good deal of stress has been laid upon the unsuccessful cases.

These occur almost exclusively in patients with long-standing syphilis and serious destruction of nerve structure. In more recent syphilis the action of iodine, as above noted, is of great value as an absorbent, and when employed to supplement anti-specific treatment excellent results may be confidently anticipated.

In all the other varieties of disease above referred to almost uniformly good results have been obtained. It is to be hoped that the few facts here submitted, may prove sufficient to induce further contributions on the subject, with a view of determining more accurately the degree in which we are justified in depending upon iodine in our practice.

374 Mountain St.

THE PRESENT STATUS OF TUBERCULIN THERAPY IN OCULAR TUBERCULOSIS.

DR. WALTER BAER WEIDLER,

NEW YORK CITY.

The first "bacterial vaccines" were introduced as a prophylactic measure against smallpox by Edward Jenner in 1798. The value of this form of vaccine has been proven beyond a doubt.

Koch's discovery of the tubercle bacilli as the germ cause of tuberculosis was soon followed by his ingenious attempt to cure this disease by a vaccine made of the same bacteria that caused it.

I think that the medical profession are all agreed that tuberculin has a most limited sphere of usefulness in general and pulmonary tuberculosis, as a therapeutic measure.

In regard to its value as a diagnostic measure, I think that it can be safely said that we are well agreed that a positive reaction to tuberculin indicates the presence of a tubercular foci, old or new, or of tubercular toxins somewhere in the body.

It is also true that the tubercle bacilli as the cause of eye diseases is more generally accepted than it was ten or twenty years ago, and many of the previously obscure lesions of the retina and the chorioid are now comparatively simple to diagnose and treat.

This new form of treatment for the manifestations of tuberculosis affection of the different tissues of the eye has had, and is still having, a difficult fight for acceptance. The earliest form of treatment for ocular tuberculosis was surgical, but as soon as we realized that ocular tuberculosis is usually a local expression of a general disease, we have almost entirely abandoned surgical means, except in hopeless cases, such as cases of threatening perforation of intraocular tuberculosis, ocular tuberculosis involving the optic nerve and the miliary tuberculosis of the iris with secondary painful glaucoma.

The therapeutic value of tuberculin depends almost entirely upon its immunizing power to set free in the body special agents known as "anti bodies," which combat the tubercular manifestations present in the eye.

The most essential factors in successful treatment of ocular tuberculosis is first of all a slow and gradual increasing of the dose, which may extend over weeks and months; careful preparation of the tuberculins; the subcutaneous injection rather than

the intramuscular, and the local and general treatment of the ocular lesion with the same means that were employed before tuberculin was added to our therapeutics.

Koch's original hypothesis was, that the reaction was due to a tissue necrosis, and that the tuberculin had a special selective action on this tuberculized tissue, causing it to slough, and that this necrotic tissue was the medium that gave the reaction to the tuberculins.

As it is well known to all, Koch made his great error in giving too large a dose and too oft repeated, causing thereby most severe reactions and in some cases death, bringing the most violent opposition to its use in the treatment of any form of tuberculosis.

The second era of the tuberculin therapy was much more favorable in its results and the ophthalmologists owe a great debt to the patient and persistent work of von Hippel, who in 1900 to 1904 was able to prove that tuberculin could be used with perfect safety, and the results following its use were most satisfactory.

Hertel's latest monograph on Tuberculin Therapy mentions 151 observers who have used and studied the results of tuberculin in ocular tuberculosis, and out of that number only twenty-three can be regarded as unfavorable toward its use and its value.

My own observations have extended over a period of three years and my series of 117 cases include the affections of the conjunctiva, the cornea, the sclera, the iris, and the ciliary body, the retina and the chorioid. Many of these cases must be ascribed to a doubtful etiology, and the author does not mean to claim that all of the cases treated and cured by tuberculin were undoubted cases of ocular tuberculosis. It is interesting and important to note that in not a single case where the reaction was positive to a tuberculin as a diagnostic measure did we fail to stop the progress of the ocular lesion, except in one case.

Koch's "original tuberculin" was the result of his work on guinea pigs. He injected into the healthy guinea pigs large quantities of the sterilized cultures of the tubercle bacilli, rubbed up in water, and found that these injections gave rise to local suppuration, but when injected into tuberculous animals even small quantities rapidly produced death.

He later found that death could be prevented and improvement obtained by the methodical use of high dilutions. When the emulsified bacilli were used they were not absorbed at the site of the injection, but remained there and gave rise to local abscesses.

He concluded from this that the curative substance of the

tuberculin must be dissolved by the tissue juices, while the substance causing abscess formation remained undissolved, or dissolved very slowly.

The old tuberculin was made from the pure cultures of the tubercle bacilli, which he had grown from four to six weeks on a 5 per cent glycerin broth. He filtered and concentrated the filtrate to one-tenth of its volume, thus obtaining in a 50 per cent glycerin medium the soluble bodies secreted by the tubercle bacilli.

This preparation proved to be too toxic for therapeutic use, but is used today in its original form for all of our diagnostic tests. After considerable work with old tuberculin, and finding that the high toxicity of this preparation was a great obstacle, he endeavored to obtain a substance which would exert the same curative and immunizing influence without the harmful effects, and he wished to obtain a solution that would immunize the individual against the tubercle bacilli itself.

This second solution was prepared in the following manner: Young and highly virulent cultures are dried in vacuo and then ground until the specimen shows no intact bacilli. To the pulverized bacilli distilled water is added and the mixture centrifuged. The upper two layers so obtained are decanted off and discarded.

The residual deposit is again dried, ground, treated with distilled water and centrifuged, the supernatant fluid being decanted off and preserved. This process is repeated until no deposits remain. The different fractions of fluid (with the exception of T. O.) are then mixed for the new tuberculin T. R.

This solution is really an emulsion or suspension of extremely minute particles of the tubercle cell substance. It is readily absorbed, and does not cause abscess formation, and is used only as a therapeutic agent.

Koch's last preparation of tuberculin is undoubtedly his best as a therapeutic measure. It was the outgrowth of his work on agglutination. He found that the agglutinating power of the blood was increased more rapidly by the injection of dead tubercle bacilli than by any of his previous preparations, and was thus led to prepare a substance of a much higher immunizing potency.

This solution is called the bacillary emulsion. It consists of an emulsion of one part of dried pulverized bacilli in one hundred parts of distilled water, to which one hundred parts of glycerine are added. This emulsion is analogous to the other vaccines consisting of a sterilized emulsion of bacteria, and may be used for its curative and immunizing properties. It must be kept in mind

that the immunity produced by the tuberculins is only an anti-toxic one, bacillary immunity in tuberculosis has not so far been produced.

The bacillary emulsion, however, seems to come nearest this, as it contains besides the tuberculin, also the bodies of the bacilli. It is the preparation which we have used in our treatment of all of our cases. It seems to be very slightly toxic and only rarely have we gotten severe reactions, and those have nearly always been local in their manifestations. We have ascribed them to other causes rather than to the solution.

We have on several occasions seen a number of our patients give marked local reactions forty-eight hours after their injections. Strange to say all of the patients had different sized doses of different dilutions of tuberculin. It would seem that the syringe or the technique had been at fault rather than the emulsion.

In using tuberculin as a diagnostic measure, we have obtained our best results in the von Pirquet test by making our scarification very superficial.

We use a small, sharp screw driver which is about three millimeters in width, and make a rotary movement with sufficient pressure to remove the outer layers of the skin which has been cleansed with alcohol. Three such areas are made on the forearm about three-quarters of an inch apart. On the upper scarified area the crude old tuberculin is rubbed gently; the middle one is untouched and is used as a control; on the lower one a 50 per cent solution of old tuberculin is gently rubbed.

This is allowed to dry and a dressing and bandage is applied and the patient returns in forty-eight hours for inspection. Our reactions obtained from tuberculin as a diagnostic measure have been at times difficult to understand.

The subcutaneous tests consist in recording the temperature for forty-eight hours and then injecting one-half milligram of old tuberculin, and if no reaction is obtained this is continued until five milligrams are given.

In some of the cases of phlyctenular conjunctivitis and phlyctenular keratitis, we have gotten the most severe local reactions. These same cases as a rule did not require a long period of treatment to immunize the patient and cure the ocular manifestations of the disease.

In contrast to this series of cases, the cases of miliary or conglomerate tubercles of the iris and the ciliary body usually gave very slight local reactions to the von Pirquet, and in some of these

cases when the subcutaneous injection of old tuberculin was given for diagnosis, it was followed by a very slight rise of temperature.

This group of cases on the other hand, required a long course of treatment. Many of them extending over a period from four to six months, and finally taking milligram doses of the bacillary emulsion without the slightest discomfort and the iritic lesion gradually absorbing and disappearing.

It is a generally accepted fact that tubercular individuals are very sensitive to the smallest dose of tuberculin, and will react to this agent when it is applied to the conjunctiva, the skin, or when it is injected subcutaneously; whereas a perfectly healthy individual will not react even to a comparatively large dose.

We have seen quite a number of cases who had suspicious ocular lesions that did not react positively to the von Pirquet or to the subcutaneous test. These patients, ranging from 6 to 40 years of age, included a number of colored individuals.

This striking hypersensitiveness of the tuberculous individuals suggests some form of anaphylaxis. The individual who at some previous time has been sensitized by the tubercle bacilli, reacts later to a minimal dose of the same antigen.

When Ch. Richet and P. Portier published their first paper entitled "De l'action Anaphylactique de Certains Venins" (*Bull. Soc. Biol.*, 1902), stating that dogs injected at various intervals with extracts of medusae are very much more sensitive to the second injection than to the first, the medical world barely dreamed of the enormous value of this discovery to biology, especially to medicine and more particularly to ophthalmology.

Definition: Anaphylaxis, says Richet, is the opposite of protection (Phylaxis or prophylaxis) and constitutes a condition in which the cells of the animal organism are so modified by their first contact with a heterogenous albumin as to react with a greater intensity when the same organism is confronted a second time with the same heterogenous albumin. A certain time or period of incubation must elapse after the first introduction of the foreign protein to the body before the organism is sensitized. Heterogenous albumin or foreign protein is one which is obtained from an animal of a different species. The term anaphylaxis designates "the curious property possessed by certain poisons of augmenting, instead of diminishing the sensibility of the organism to their repeated action" (*Richet L'anaphylaxie*, 1902). *Schoenberg's N. Y. State Journal*, October, 1914.)

When making our tuberculin tests in the clinic we have been limited to the von Pirquet alone, but in nearly all the ward patients we have always supplemented the von Pirquet with the subcutaneous injection of old tuberculin.

The focal reaction which manifests itself by increasing the inflammatory process in the eye, have been few. In several cases this has been noted, and it is on this reaction alone that many rely. It is because it is absent in so many cases that the argument has been raised that we are not dealing with an ocular manifestation of tuberculosis, but it must be remembered that the primary focus of infection may not of necessity be in the eye. I think the hypersensitiveness of the individual and the kind of toxins present are determining factors in the focal reaction, and previous treatment by tuberculin will influence this reaction.

The local reaction usually consists of a slight redness of the skin and subcutaneous tissues, around the area of the scarification or the injection. At times we have pronounced redness, swelling, heat and tenderness with the formation of a large scab at the area of scarification looking exactly like a true vaccination scab from cowpox inoculation. Some of our most pronounced reactions are due, no doubt, to a mixed infection. We have not had a single case of this sort in the past two years.

The general reaction consists in a rise of temperature, usually within three to six hours after the injection, of from one to three degrees with the usual symptoms accompanying a slight fever. I have never seen a severe reaction with vomiting, headache and eruption on the body, and I believe in these cases they must have had an impure or a decomposed tuberculin to give such violent reactions. The great many positive reactions to the von Pirquet test has brought great discredit on this test, and many regard it of slight or no importance whatsoever. I think in the light of investigation, it must be admitted that many more individuals than we ever fancied have had some form of tuberculosis at some period in their life.

Hamburger's studies of 848 children from the newborn infant up to 14 years of age, gave an average of 40 per cent who have been infected, and as one can readily see that children of this age are less exposed to the disease, its presence in many cases may have been due to inheritance. It might be reasonable to suggest that it is this tendency or hypersensitiveness that is transmitted from parent to offspring.

This is quite true of syphilis, why is it not true in tuberculosis, where there may be an active strain of tuberculosis in the parent? This may help us to understand more clearly what we mean by scrofulosis, which term has always been used in such a general, vague and inclusive manner.

Those of his series up to three months of age showed 4 per cent with a steadily increasing ratio as the age increased; those between the age of eleven and fourteen years of age showing a percentage of seventy degrees. These results were obtained from his studies post mortem, and must be taken with some degree of doubt, due to possible errors of observation.

A negative reaction to tuberculin has usually been accepted as an indicator that the individual has not been, and is not, affected by tubercular toxins; however, there are exceptions to this rule and they must be borne in mind. We may not get a positive reaction in an acute and violent infection; or in the last stages of a general tubercular disease; or during the period of inoculation of the disease; and in some patients who have been rendered immune by a long course of treatment with tuberculins.

It has been suggested in way of explanation that failure to obtain reaction in this type of cases, is due to the fact that the body cells of the individual are not in condition to produce antibodies which are the necessary factors in securing a reaction.

The tubercular affections of the conjunctiva are comparatively rare, especially in this country, but much more frequent in Europe where the hygienic conditions are so wretched. The true tubercular ulceration due to a direct local inoculation; the miliary tubercles, hypertrophic granulations or lupus of the conjunctiva, I have not seen during the period of this work. One case of lupus erythematosus affecting the skin of the eyelids in a Jewess 30 years of age, gave a negative von Pirquet and was never given tuberculin treatment, but a cure, and I say cure in a limited degree, was effected by means of carbonic snow.

Whether phlyctenular conjunctivitis should be regarded as a manifestation of tuberculosis has been the subject of a great deal of discussion, and there is still a great diversity of opinion regarding the etiology of this disease. Depending upon the investigators, the von Pirquet reaction is positive in from 70 to 90 per cent of these cases. In discussing Dr. Theobald's paper on phlyctenular ophthalmia at Atlantic City in June, I said that I thought it was a great mistake to assume that all of the cases of phlyctenular ophthalmia were due to tuberculosis, but it was also a mistake to

say that none of these cases were due to tuberculosis. Bruns stated three years before that they were all due to auto-intoxication.

To argue that because the tubercle bacilli has never been isolated in a phlyctenule is sufficient to refute the tubercular theory that any of the cases of phlyctenular ophthalmia are due to tuberculosis, I think is inconsistent reasoning. The same investigators will diagnose cervical adenitis as tubercular without the presence of tubercle bacilli. I think that a great many of the cases of cervical adenitis that get well by local and general medication are not due to direct presence of the tubercle bacilli, in the gland, but are due to a general tubercular toxemia, the result of some inherited or acquired strain of tuberculosis.

I do not believe that phlyctenular ophthalmia is due to tuberculosis in every instance, but I do know that a very high percentage of these cases will show a positive von Pirquet and a general reaction to tuberculin. Furthermore, many of these children show enlarged glands, joint affections, and we often get a family history of tuberculosis.

The phlyctenular lesions of the eye, I believe, are a local manifestation not due to direct action of the tubercle bacilli, but due to the action of a tubercle toxin or end toxin.

It is not always possible to demonstrate the tubercle bacilli in some of the chronic ocular tubercular diseases with pulmonary lesions demonstrable (*Verhoeff's Case*, *A. M. A. Journal*, July 4, 1914, Vol. LXIII).

The treatment of forty cases of phlyctenular ophthalmia with tuberculin by Davis & Vaughn show a very much larger and quicker percentage of cures than by the old methods heretofore employed. Tivnen reports a series of fifty cases with 64 per cent of cures and 24 per cent improved, and Herrenscharf reports a series of 103 cases with 101 cures, the two failures were in cases where there was great involvement and they all responded well to the treatment. However, I do think that recovery is hastened by an early removal of the glands. In the first two years of this work with tuberculins in phlyctenular ophthalmia, no local or general treatment was given and no attention was paid to the diet or hygiene. We are now convinced of the excellent results obtained with tuberculin, and believe that the local and general treatment is useful, and that the diet should also be attended to.

Keratitis, Superficial and Deep.—The greatest number of cases that we have treated with tuberculin have been affections of the cornea. These have been mostly superficial keratitis affecting the

epithelial layer and Bowman's membrane and rarely or never causing ulceration. Several cases have been true interstitial keratitis, and in one there was a large sloughing ulcer involving the middle third of the cornea. I have seen, during these observations, several cases of episcleritis and scleritis in which I was able to secure a positive von Pirquet and a general reaction to tuberculin. Torek claims that from 90 to 95 per cent of all cases of epi and deep scleritis are due to tuberculosis, but I think that this is too high. We all see at our clinics many causes of keratitis in children which always requires a very long treatment with atropine, diet and tonics, and which always show a great tendency to recurrence. A great many of this type of cases were cured by the "old form" of treatment, but there are a number, however, that I believe would be greatly benefited by the tuberculin injections, and I especially direct your attention to them.

Again in those cases where there is a direct history of tuberculosis in the family; where there is a history of recurrent eye trouble and in those pasty colored, pale, overfat children whom we have always recognized as not good healthy, vigorous children, it is in this group I also feel, that tuberculin therapy is absolutely indicated and of great lasting good in raising and maintaining the opsonic index and establishing immunity.

In spite of a long treatment of tuberculin in some of these cases, we have seen recurrences of the ocular inflammation. When they are again given tuberculin injections, it is only a matter of three or four injections and then active reactions immediately follow the tuberculin ocularly, locally and generally.

HISTORY.

Case 1.—M. D., white, aet. 7, family history negative; child has had trouble with eyes for past two and one-half years, and has been treated during this period in the usual manner with no lasting improvement. When seen by me there was great photophobia and lacerimation, and a great number of deep opacities and fresh infiltrates in the cornea of both eyes, more in the left. There was a large, deep ulceration involving nearly half of the left cheek. The child had a pasty, pale, doughy complexion, and was over fat for her age. Wassermann test and urine negative. A very severe reaction to von Pirquet, and was admitted to the hospital and was given tuberculin injections. Relief of all local irritation, gained weight, ulceration of the face cleared up within two weeks and was discharged after two months of treatment. The treatment was con-

tinued in the hospital until we obtained several local reactions to the injections.

Case 2.—P. P., white, aet. 10, family history negative (?); child has had trouble with the left hip for four years or longer, which looked like a tubercular osteitis. There is an open sinus still seen discharging pus. Came to the clinic on account of the inflammation of both eyes, and the school nurse brought her because she could not do her school work. There was photophobia and lacrimation, and a very well marked case of interstitial keratitis in both eyes. The Wassermann test was positive and patient had well defined Hutchinson teeth. The von Pirquet gave a very decided reaction. This case was put on tuberculin and was given injections for a period of three months, but the course of treatment was most unsatisfactory, on account of the irregular attendance at the clinic. The local ocular condition was greatly improved, as was the general condition of the patient. She was admitted to the ward and a subcutaneous injection was given and temperature rose to 104 degrees. After her admission to the hospital I ordered the continuance of the tuberculin injections and also the use of mercurial inunctions.

The child gained weight, the sinus of the hip discharged much less and gradually closed. The corneas gradually cleared. This was undoubtedly a double infection which was greatly improved by the use of mercury and tuberculin.

Previous to the use of tuberculin injections in *tubercular iritis and iridocyclitis* the course of these cases was often a matter of months and years, with usually the loss of vision and often the enucleation of the eye. We have treated five of these cases with very excellent results. In one of these there was no restoration of the vision which was reduced to light perception when we first saw the case. At the present time two have normal vision in the affected eye, and two have one-half normal vision after treatment. It is this type of cases that we have had most excellent results with the tuberculin.

Roemer says that he is not convinced that the therapeutic capacity of tuberculin in the treatment of tuberculosis of the iris and ciliary body has not been and still is not over estimated. I think that we see our cases much earlier than they do on the continent, and that, therefore, our cases are not as severe in the degree of ocular involvement, and we get better results from our treatment.

Case 3. Irido Cyclitis and Uveitis.—K. K., aet. 26, Bohemian; family history negative, general health always good. About a year ago O. S. was enucleated at Mt. Sinai Hospital on account of a

most severe irido cyclitis, which they feared at the time might cause sympathetic ophthalmia. There was a history of the patient having been struck in the left eye with a baseball. The case came to our clinic at the Manhattan Eye and Ear Hospital at which time the right eye was giving her a great deal of pain and discomfort.

O. D. pronounced photophobia and lacerimation, very marked pericorneal injection and ciliary tenderness. Iris was muddy and the pupil was irregularly oval, long axis 135 degree. Vision was reduced to counting fingers at ten feet. I consulted the surgeon who enucleated the left eye and he said that there was undoubtedly a specific history which I was unable to secure, and the Wassermann test that we made was negative. She was admitted to the house three days later and a von Pirquet which was done in the clinic gave a most violent reaction with a slight rise of temperature. The patient was given a subcutaneous test which was strongly positive and she was put upon the tuberculin treatment and the local use of atropine in the eye. There was a consistent, gradual improvement of vision with a gradual decrease of all inflammatory signs in the eye. The vitreous gradually clearing after seven weeks of tuberculin injections. When she left the hospital her vision with +0.50 axis 180° was 20/20.

The pupil never returned to a central round opening, but I have been able to observe the case for over a year and there has been no return of any trouble in the eye.

Case 4. M. W., white, aet. 7: family history negative, the patient had measles, whooping cough, no convulsions or fits. Child came home from school with a red rash over body, no fever or vomiting, but the next day the mother noticed that the left eye was inflamed: the family physician said it was a cold that had settled in the eye. The redness grew less and mother noticed a yellowish red spot in the lower part of the eye, and came to the Manhattan Eye and Ear Clinic with the child, at which time the following condition was noted:

O. S. down and out there was a yellowish area about three by five millimeters in size and two millimeters high, with a number of small dust-like spots in the anterior chamber, and on the posterior surface of the cornea. The heavy yellow exudate in the anterior chamber seemed to extend from the anterior surface of the iris to the endothelial layer of the cornea. It was dense and did not change its position when the eye was moved up and down. There was a slight pericorneal injection, the aqueous was muddy and the iris was discolored. The pupil was partially and unevenly dilated

showing the presence of almost complete posterior synechia. There were several new formed blood vessels running into the mass and over the surface of the nodule. Transillumination revealed a shadow in the lower half of the eye, which was due to the exudate in the iris, ciliary body and the vitreous. This grayish exudate in the vitreous appeared to occupy the lower and outer one-third of the vitreous body.

Vision O. D. 20/20, O. S. fingers at eighteen inches. Wassermann test and urine negative. A very slight reaction to von Pirquet which was recorded at the time as negative reaction. The case was treated with atropine, dionin and heat locally, syrup Ferri Iodid was given together with a glass of milk and raw eggs twice a day, and small doses of calomel. This treatment was persisted in for two weeks, with slight or no improvement in the external appearance of the eye. Another von Pirquet was done with about the same degree of reaction as was obtained at the time of the first test. Tuberculin treatment was started and has been persisted in over a period of six months. The eye condition has gradually improved, notwithstanding the negative reaction. The nodule is gradually decreasing in size; the pupil is dilating and the vision is slowly improving, and the patient has gained weight. The vision when last recorded was counting fingers at three feet. The dose of B. E. has gradually increased from 1 100,000 of a milligram to three and one-half milligrams, without any reaction.

The tubercular affections of the retina and the chorioid are being diagnosed much more frequently since the introduction of tuberculin.

Marple and Young made a study of thirteen cases of tubercular meningitis at the Babies' Hospital to determine the frequency of chorioiditis in this condition, and they found in 100 per cent there was chorioidal manifestations of the disease. Previous to their report, Stephenson and Carpenter were able to find chorioidal lesion in 50 per cent of the cases studied by them.

Case 5. Retinitis Exudativa (tubercular).—Miss J. M., aet. 19, Italian hatmaker, mother and father living and well, one brother died of tuberculosis three years before. The patient says her general health has been good. Seven years ago the cervical glands on the right side were removed, and from the size of the scar, a very radical operation was performed. The glands had broken down before they were removed. Two weeks ago noticed floating spots before the left eye and that her sight was rapidly lowered. No pain in the eye and her general condition was good.

Was seen at the Manhattan Eye and Ear Clinic, and her vision was O. D. 20/15, O. S. 5/200, 02 pupils three millimeters, iridis brown and react to light, accommodation and convergence tension normal.

Ophthalmoscopic examination.—Fine floating opacities in vitreous, rest of media clear, disc oval seven by eight m.m., long, axis is 90°. Edges of disc are blurred and optic nerve head in indistinct and pale. In the macula region there are five or six white spots varying from three to five millimeters in size, with a light area in the retina surrounding these spots. They are slightly elevated and give one the impression of an oedema of the retina.

The case was admitted to the ward and treated in the following manner: Rest in bed, pilocarpin sweats, gentle saline purging each morning, atropin and tonics. This was continued for seven days with no apparent change and a von Pirquet was made which was positive, and later a subcutaneous test was made with a very marked local and general reaction. Wassermann test and urine negative. The patient was started on tuberculin treatment. Inside of ten days the oedema of the retina began to clear, the swelling decreased, and the vision gradually and steadily improved. The treatment was given over a period of three months continuously. After one month the vision with a correcting glass (O. S. +0.50 spc. +0.50 ax. 90 degrees) was 20, 20, and three months later 20 15.

The ophthalmoscopic picture had completely changed, and six months after the beginning of the retinal affection the media was clear, disc oval seven by eight, long axis 90 degrees, scleral ring all around, central excavation small, vessels long axis 90 degrees. There is an area up and out from the macula with a white center and slight pigment deposit along the lower edge of the retina.

The case has been under observation from time to time over a period of two and one-half years with no recurrence. This case was a retinal manifestation of ocular tuberculosis giving positive reactions to all the tests, together with the family history of tuberculosis and a personal history of tubercular cervical glands. The process was much more localized and superficial than the chorioidal affections and the response to tuberculin treatments more rapid. The secondary changes were quite different from the chorioidal lesions, the pigmentation being much less, with little or no exposure of the scleral coat and the vision returning to normal or even better.

Case 6. Tubercle of the Chorioid.—Mr. C. C., act. 26, Jew, salesman, family history negative, patient's general health always good. Has worn glasses for the past three years for myopia. He noticed

for the past two weeks floating opacities before the right eye and the vision gradually got worse as opacities increased in size and number.

Was seen at the Manhattan Eye and Ear Hospital November 23d, 1914, and an examination of the eyes revealed the following condition: O2 pupils three millimeters, iridis blue and reacts to light accommodation and convergence, and the tension is normal. Vision: R. E. 20/20, L. E. 20/20.

Ophthalmoscope, right eye: Cornea shows a number of punctate deposits on the endothelial layer, scattered generally over the lower portion. The pupil is dilated with atropine. The upper edge of the iris is ragged and the retinal pigment layer of the iris has a moth-eaten appearance. Dustlike deposits are scattered over the anterior surface of the lens. The vitreous shows spiderweb-like opacities with many larger ones, more or less immovable. Best seen when the patient looks straight ahead, having a bluish pearly grey color and giving somewhat the appearance of the retained canal of Cloquet. The whole nervehead is indistinct and pale and the margins are blurred. The veins are somewhat swollen and turgid, especially the lower branches. There are several hemorrhages on the disc head up and out. The retina throughout has a hazy, dirty, dull red color, and to the nasal side about a disc's diameter from the optic nerve is seen a light pale gray area, eight by ten millimeters, with undefined margins showing the retinal vessels crowding over the top, being somewhat more elevated at the edges than in the center, and around the edges are seen a number of small miliary tubercles. This is especially well seen at the lower edge of the area, and above these miliary spots, which number eight or ten, is noted the early deposition of the pigment.

The Wassermann test was negative. The von Pirquet was +++ positive, and the patient was admitted to the house and a subcutaneous injection of old tuberculin was given which was followed by a local and slight focal reaction.

The patient was put upon bacillary emulsion and the vision gradually got worse until it fell to 20/40. The injections were continued and after two months the fundus began to clear and vision continued to improve. The treatment has been continued for four months and at the present time his vision is 20/30.

Ophthalmoscopic examination after four months of tuberculin right eye: The media is clear, disc oval seven by eight, long axis 90 degrees, scleral ring all around, central excavation small and vessels long, axis 30 degrees. There is an area about two disc diam-

eters from the nervehead to the nasal side where the chorioidal pigment may be seen heaping itself around the border of the chorioidal scar. The central portion is white and the retinal vessels pass over it without interruption, showing that the disease has been limited to the chorioid. The tubercular area measures eight by sixteen millimeters in size.

The treatment was started at 1/100,000 milligrams, and he is taking at the present time one milligram at a dose, and the tuberculin will be increased until we get a local reaction at the point of injection.

Case 7.—Miss A. R., act. 18, clerk, family history negative, general health always good, has worn glasses for eight years on account of myopia and astigmatism. About four weeks before I saw her the right eye became red and inflamed and she saw floating particles in front of the eye, and noticed that her sight was gradually failing.

Vision: Right eye with —3 spe. —1 cyl. ax. 135 degrees, 20/70.

Vision: Left eye with —3 spe. —1.50 cyl. ax. 180 degrees, 20/20.

There was some slight pericorneal injection and a slight degree of photophobia but no really active ocular irritation.

There is quite a well marked deep punctate keratitis and a considerable amount of vitreous exudate. The disc edges are blurred and indistinct, but the vessels do not show any change. About two disc diameters from the nervehead to the nasal side of the fundus is seen a bluish white area slightly pigmented with a number of smaller highly refractive bodies about the margin of the foci of inflammation.

A Wassermann test was negative. Von Pirquet was made and the reaction was so slight that it was first considered doubtful, but the scarified areas of the von Pirquet tests remained persistent for days and I decided to use tuberculin in a case that most observers would have regarded as negative.

The treatment was persisted in with the local use of atropin. Patient was allowed to resume her desk work, and for about six weeks all intra-ocular conditions gradually increased in severity and the vision declined to 20/200 with correction.

The corneal opacities began to clear in a few days and were entirely absorbed within two weeks. The fundus shows a gradual absorption of the vitreous exudate, which had become so dense that any view of the retina, chorioid and optic nerve was impossible.

The tubercular foci is clearing and the central portion is becoming white from absorption of the chorioidal pigment and the sclera

is plainly seen, the edges are slightly elevated and the chorioidal pigment is being heaped up along the margins of the tubercle.

The retina and the retinal vessels pass over the surface of the area apparently unaffected. The disc is plainly seen again and shows no changes following the tubercular chorioiditis.

These two cases of conglomerate tubercles of the chorioid were very much alike in their onset and the external and ophthalmoscope picture they presented. The location of the lesion was the same in both of the cases here reported. The chorioidal tubercles, as a rule, give slight or no external signs of inflammation except for the deep punctate keratitis, which rapidly disappears with the use of tuberculin. There is usually a severe reaction of the vitreous and the conglomerate tubercle of the chorioid is accompanied with many smaller ones which gradually melt into the slow growing tumor. There was present optic neuritis in both cases, and this is usually observed.

The treatment in the first two years of my work was limited to the injection of tuberculin without drugs being used locally, except for a boric acid wash. The diagnosis was made in the great majority of my cases, by means of the von Pirquet test. If we secured a positive reaction we assumed that our patient was hypersensitive to tuberculin and we believed that the ocular lesions would get well with the tuberculin treatment. In the first two years of our work we only failed to clear up and cure the lesion in one case. This was a case of miliary tubercles of the iris which did not come under observation until there was complete occlusion and seclusion of the pupil, from what must have originally been a serofibrinous exudate which, when we first saw the case, was thoroughly organized and the vision was reduced to light perception. After two months of tuberculin without any other treatment, the eye was quiet and white.

During the past year after using tuberculin diagnostically if it was followed by a positive reaction, it was then used therapeutically, together with atropin, hot applications, the diet was attended to and the patient was admitted to the hospital whenever possible.

We have two cases in this year's group that are still under treatment, in which cures cannot be claimed. The case of miliary tubercle of the iris is greatly improved, the other one, a case of deep tubercular keratitis in which the right eye has a complete leucoma of the cornea with shrinkage of the globe, and the left eye has just recently had fresh infiltrates in the central portion of the stroma layer of the cornea.

One might well ask the question: "Will tuberculin treatment do more than our previous forms of treatment for ocular tuberculosis?"

Tuberculin treatment used by itself will do as much and more than any of our former methods of treatment, especially in the cases of miliary or conglomerate tubercles of the iris and ciliary body and tubercular lesions of the retina, and the miliary or conglomerate tubercles of the chorioid.

Tuberculin injections supplemented with our former methods of treatment in all suspected and proven cases of ocular tuberculosis is undoubtedly the best means that we have for treating this class of ocular disease.

In conclusion let me add:

I. A positive reaction may not be as dependable in suspected ocular lesions of tuberculosis as a positive Wassermann reaction is in suspected ocular lesions of syphilis, but it is at least a strong indication for tuberculin therapy.

II. Tuberculin as a therapeutic measure has an absolutely proven place in the domain of ophthalmology from the results of such men as von Hippel, Hertel, Vaughn and Davies, Tivnen, Thomson, Weeks, Marple, Derby, and my own observations.

III. I believe a great many failures to get results from tuberculin therapy has been due to faulty technique; not continuing the treatment long enough; imperfect and inert tuberculin vaccines; or the use of the wrong tuberculin vaccines.

IV. I further believe that it will be proven as our investigations proceed, that it may be necessary to change our tuberculin when we do not get good results from one kind and use some other form of tuberculin vaccines.

V. The ophthalmologist who is not using tuberculin as a diagnostic agent and as a therapeutic measure is not practicing modern ophthalmology.

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Abstracts From Recent Ophthalmic Literature

AMBLYOPIA AND BLINDNESS

TREATMENT OF UNILATERAL AMBLYOPIA.—HEINE, L., Kiel (*Muench. Med. Woch.*, October 26, 1915). H. believes that the cause of unilateral amblyopia lies between the failure of development and the suppression of the image from one cause or another. Some correction will follow the use of exercises, provided they be begun early enough in life (before the age of puberty). He agrees with Straub that if a hyperopia be present, it should be referred to as "Hyperopia minus so many diopters," for the eye lacks that many diopters of being emmetropic. Consequently, the error of refraction may be used as one phase of a terrestrial telescope and a weak plus lens may be held at the focal distance of the lens from the punctum remotum of the eye. This gives the simplest form of telescope and practically always doubles the vision of a defective eye. Such vision may also be improved by the constant use of stenopaic slits or holes. H. S. G.

SOME COMMON FALLACIES ABOUT BLINDNESS.—HAWKES, CLARENCE (*The Outlook*, November 3, 1915). "There is probably no abnormal condition of life so little understood and appreciated and about which so much that is erroneous has been written as that of blindness.

The very conditions under which the blind live are so extreme and startling that there has gradually been built up about them a world of fable and fancy as extravagant, if not as thrilling, as the world of fairy stories.

It is to correct some of these erroneous ideas, as well as to point out other facts which are little less remarkable, though truthful, that this article is written.

I have had hundreds of people ask me if I could tell color by the sense of touch. How any sensible person could get the idea that it is possible to tell color from the sense of touch is amazing. It is probably partly due to the fact that the public wants to believe all sorts of wild things about the blind, and also because some blind folks, partly in fun and because they like to astonish their friends, have practiced a sort of magic at their expense. I knew a blind horse dealer who could really tell the color of a horse

by the sense of feeling, but the color itself had nothing to do with the feat. It was all performed through the fact that different colored horses had different textured coats. With some colors the hair was fine, while others were coarse; some coats were smooth and others rough.

Most blind people know the colors of the common flowers, and when a friend places a bouquet in your hand you are always able to recognize the flower by either the perfume or the touch, so one can usually make a very good guess as to the color, although in these days of new shades and widely variegated flora even that little artifice is rather dangerous.

It is also a very common question to have seeing people ask the blind if they can tell the denomination of different bills by the sense of touch, and many folks have told me that they knew blind people who could.

There is only one general rule concerning bills that gives any clew at all as to their denomination, and this has so many exceptions as to be entirely worthless.

Bills larger than one dollar are usually printed upon heavier paper than dollar bills—or at least that has been my impression, but the Treasury Department might tell me that even that conclusion is erroneous.

Most blind people carry a pocketbook with several compartments and keep their bills of different denominations in different compartments, so they know where they are. In that way they can readily make change and give the impression that they can tell bills by the sense of touch.

There are things that they can do by the sense of touch which are even more remarkable, such as threading a needle by placing the end of the thread on the tongue and shoving the head of the needle along until the thread is thrust through the eye, or replacing delicate springs in a typewriter and keeping the machine in order. I recently successfully adjusted the reproducer on a graphonola which had become discordant.

It would seem almost as wonderful for one without the sense of sight to trace the margin on a printed page of a book or newspaper to feel where the type leaves off and the unprinted page begins. Yet I can do that, while I have known blind people who would read raised print through four thicknesses of a silk handkerchief, or play a piano with a spread placed over the keyboard.

To tell the weight of paper in ream lots within five or ten pounds merely from feeling one sheet would seem to call for a very expert

sense of touch, yet that is possible, as well as to tell much about the texture and quality of the paper and how it was prepared for book use.

It is probably due as much to the extravagant things that have been written about them as to the rather harmless practices of the blind people themselves that so many erroneous statements have got abroad.

"The Rosary," by Mrs. Florence Barclay, with all its admirable qualities, and notwithstanding all that it has doubtless accomplished for the blind, abounds in amazing portrayals of the condition of blindness.

Readers of "The Rosary" will remember that a crafty Scotch doctor devises the plan of putting in charge of a blind artist, as his nurse, a former sweetheart from whom he has become estranged. While the artist is suspicious of the voice, which reminds him strongly of his friend, although the nurse is using another name, yet he finally succumbs to the subterfuge and is deceived for several weeks until she at last reveals her identity. The entire plot of the story hinges on this deceit.

The fact is that such a deceit would be impossible.

There is as much personality and character in the human voice as there is in the face. It is just as reasonable to say that you would not know your friend by looking on his countenance as that a blind person would not know his friend by the voice, especially when the friend was a sweetheart.

If the voices of a thousand people were tested and analyzed, they would be found to be as individual as the faces of their owners.

I have never in my life met two people whom I could not tell apart by their voices after I came to know them fairly well."

H. V. W.

TEACHING THE BLIND.—(Editorial *Seattle Daily Times*, November, 1915). "Several thousand soldiers, who went forth to battle in the possession of all their faculties, are today in institutions in Britain, France, Germany, Austria and Russia, facing a life of mending darkness. The missiles that robbed others of life or limb spared them in part, but took away their sight.

"The victims are young men, the pick of their several nations, just entering upon the battle of life. A few months—in some cases, a few weeks—back they were planning for the future, after the conclusion of hostilities. Today, a terrible darkness has settled down upon them and their case is all the more bitter because

they have been possessed of sight and actually realize what they must forever miss.

"The fate of those so incapacitated early in the war was truly terrible. None of the belligerents had made provisions to care for blinded soldiers. They were sent to hospitals, like other wounded; but whereas the latter returned to service when cured or to private life if permanently disabled, the unfortunate blind were retained in the institutions indefinitely.

"In those early days, some of these ill-fated individuals sought death; many others unquestionably would have welcomed it. They were utterly lost and groped about in a new life, without hope and without purpose.

"Then some one in each state remembered the need for tackling this problem. Various expedients were adopted. The blind were entertained; they heard famous actors, humorists and lecturers; they were regaled with music. All of which proved unavailing.

"In the end they were set to work. Their hands were trained to new tasks. They were taught the usual arts of the blind—broom-making, chair-caning, basket-weaving. The change was instantaneous. The victims ceased to regard themselves as men set apart from the world. Their work made them one again with the society of which they were a part.

"Of course, the problem of caring for the blind is not yet solved. It never will be wholly solved so long as the victims live. But means have been found to relieve the distress of the victims and in this way grateful nations have taken the first step toward repaying, in part, the debt they owe to these men who have sacrificed their eyesight on the altar of patriotism." H. V. W.

ANATOMY.

CILIARY PROCESSES ON THE PUPILLARY AREA.—CLAPP, C. A., Baltimore, Md. (*Ophth. Record*, June, 1915). Child, age 5 months, upon examination of the eyes the pupils were found immobile to light, dilated slowly with atropin and between iris and lens were seen peculiar fringe-like bodies completely encircling the pupil, being almost black and about ten in number with rounded ends, leaving a very small pupillary space through which the outlines of the nerves could be seen with difficulty and borders seem somewhat blurred. At times the eyes seem to follow light. In center of right lens a small opacity was noted.

In support of the supposition that it was due to a specific toxin

is the effect of mercurial treatment which has produced a marked shrinking in length and number of the processes. G. I. H.

ANOMALIES

ALBINISM OF THE EYES WITHOUT INVOLVEMENT OF THE HAIR AND SKIN. GAMBLE, WM. E., Chicago, Ill. (*Ophth. Record*, May, 1914). Report of a case. A male age 27 months. G. I. H.

CONGENITAL APHAKIA WITH MICRO-CORNEA. ADAMS, ELDRIDGE, Chicago, Ill. (*Ophth. Record*, May, 1915). The patient is a white male, 19 years old, and of Finnish descent. There is a convergent, alternating, concomitant, strabismus, of about thirty degrees. The diameter of the palpebral fissure is about nine millimeters. The cornea has the oval shape, as the conjunctiva overlaps the cornea to the extent shown. Through the conjunctiva, the iris can be seen. It is apparently normal. In the center of each cornea there is a symmetrical, circular, nebular, opacity, three millimeters in diameter. The curvature of the cornea is normal.

On examining for the Sanson-Purkinjé images only one image (that formed by the cornea) could be seen. G. I. H.

CONGENITAL DIVISION OF THE OPTIC NERVE AT THE BASE OF THE SKULL.—SNEAD, C. M., Jefferson City, Miss. (*Arch. Ophth.*, July, 1915, XLIV, 418. *Trans. from the Archiv. f. Augenheilk.*, Vol. LXXVI, 1914). The author reports the following anomaly: "The right optic nerve divides in front of the chiasm, at a distance of about 6 mm., into two parts, of which the one situated on the temporal side measures about $2\frac{1}{2}$ mm. while the nasal one measures 4 mm. As these two parts approach the eyeball they again unite to form a round strand which seems to be perfectly normal." The results of microscopic examination are given and the author refers to three other cases reported in literature. The article is illustrated. W. R. M.

BACTERIOLOGY

PRACTICAL VALUE OF ROUTINE BACTERIOLOGICAL EXAMINATIONS OF THE CONJUNCTIVA.—SNYDER, WALTER, Toledo, O. (*Ophth. Record*, July, 1914). The author gives the manner in which this work is done in his office. The last two years he has been examining microscopically every case ophthalmia neonatorum that their nurses could find in a city of 180,000, and the gonococcus

is far down in the list of causative factors. The worst and most persistent case he has ever had was caused by the streptothrix.

G. I. H.

CATARACT

TREATMENT OF THE EARLIER STAGES OF SENILE CATARACT.—SMITH, HENRY, Amritsar (*Ophth. Record*, October, 1914). The author states, "Given a case which is sound apart from this stage of cataract, with distant vision reduced to 6/8th, 6/9th or 6/10ths, 25 minims of a 1 in 4,000, 5,000 or 6,000 solution of cyanide of mercury, according to the age of the patient (the younger the patient, the stronger the solution required to produce the standard reaction) injected sub-conjunctivally, the patient being under the influence of cocaine locally and having had a hypodermic of morphia up to half a grain an hour previously, will, in my observation, within a month of the injection bring the patient's vision back to 6/6ths or even 6/5ths, and at the end of three months he will be one line better on the test card. The fact that senile immature cataract can be extracted in capsule as easily as mature cataract, and with as uniformly good results, is one of the strongest claims in favor of intra-capsular extraction of cataract. G. I. H.

AN OPERATION FOR SECONDARY CATARACT.—GREEN, A. S., and GREEN, L. D., San Francisco, Cal. (*Ophth. Record*, May, 1915). Where the after cataract is a dense membrane, it requires a great deal of force to penetrate with iris forceps. To overcome this the writers devised the instrument. One blade of the forceps is a knife needle, while the other is a grooved and toothed forceps blade. The closed blades are introduced within the anterior chamber with the needle portion down. The needle is then pushed through the membrane and the upper blade closed down upon it and with the side to side, and back and forth motion the membrane is gently withdrawn. G. I. H.

A CATARACT INCISION LEAVING AN UNDETACHED CONJUNCTIVAL FLAP WITH BRIDGE OF CONJUNCTIVA ON TEMPORAL SIDE.—TODD, FRANK C., Minneapolis, Minn. (*Ophth. Record*, August, 1915). After puncture and counter puncture have been made, the handle of the knife is turned downward so that the end of the blade on the nasal side does most of the cutting, though the heel of the knife is allowed to cut to some extent. As the incision proceeds, the point end of the knife is allowed to do the cutting. The incision is

carried well up on the eyeball in the conjunctiva, so that when it is completed, the nasal excision extends well up above the center of the cornea, ending in the median line of the cornea or to the temporal side. The temporal incision is very short, perhaps about twice or thrice the width of the knife blade, in fact just wide enough to permit the incision to come completely through the sclera at or near the corneoscleral junction. Thus a considerable bridge of conjunctiva is left on the temporal side. Counter pressure may thus be readily made without placing the spoon underneath the conjunctival flap, and delivery is quite simple through the larger (nasal) opening.

G. I. H.

PROGRESS IN THE TREATMENT OF CATARACT IN INDIA.—SMITH, HENRY, Arimitsar, India (*Ophth. Record*, September, 1915). The author believes that it will not be many years before intracapsular extraction is the operation of election throughout the Indian Empire, and that those who stand out against it will disappear from want of material. Col. Smith is firmly convinced that it is surely time that we have a post-graduate school to teach the subject to those pursuing a career in ophthalmology in the Indian Empire. "We should not leave postgraduates to the meager material of Germany and Austria, since it is to Vienna and Berlin men go for post-graduate instruction, rather than to Great Britain."

The objects of this school which he advocates are: The study and teaching of the causes and prophylaxis of the many diseases to which the eye is incident in India. The teaching, both theoretically and practically, of the methods of treatment of diseases of the eye. The utilization of our material to such a degree that men and women of all the world will come for instruction to India.

G. I. H.

SOME UNUSUAL FEATURES IN THE CASE OF A SENILE CATARACT EXTRACTION.—BURNHAM, G. HERBERT, Toronto, Canada (*Ophth. Record*, October, 1915). A preliminary iridectomy had been performed nine months previously on a woman age 80. The orthodox operation was performed. The moment he touched the surface of the lens it was instantaneously dislocated downwards, and the vitreous flowed freely. Then quickly introducing the wire scoop the lens was removed entire in the capsule, and attached to its periphery throughout, as an apron, was apparently the whole of the suspensory ligament of the lens.

G. I. H.

A METHOD OF ARTIFICIAL MATURATION OF CATARACT ALLOWING OF EARLY EXTRACTION.—CLEGG, J. GRAY, Manchester, Eng. (*Report of 1915 Congress Oph. Soc. United Kingdom, Med. Press, May 12, 1915*). The method was, briefly, as follows: The night prior to operation the pupil was well dilated with atropine, and paracentesis was performed with an iris knife. Massage was applied directly to the lens capsule by a smooth iris repositor, and this was followed by indirect massage by the back of a lens scoop. Atropine was again instilled. If no irritation resulted, no more atropine was used after the day of operation. Often within a week the eye was perfectly quiet, the pupil returned to its ordinary size and regained its activity. Extraction could then be resorted to, either without or with iridectomy. In this way the whole process could, in many cases, be gone through in three weeks, to recovery.

C. H. M.

CAPSULAR OPACITIES OF THE MORGAGNIAN CATARACT.—HERBERT, LT. COL. HERBERT, Nottingham (*Report of the Annual Congress of the Ophth. Soc. United Kingdom, April, 1915, Medical Press, May 12, 1915*). The writer read a communication on the capsular opacities of Morgagnian cataract. He showed microphotographs of the capsule of a very long-standing cataractous lens which had passed beyond the Morgagnian stage. The capsule showed scattered white dots clinically. Under the microscope these were found to consist of spaces formed between layers of thickened capsule, and containing, mainly, lens *debris*, similar to the "milk" of the cataractous lens. Reasons were given for supposing that similar changes may account for the globules of clear rings of after-cataract. And reference was made to two processes at work, singly or together, in senile cataract: The one, representing simply deficient nutrition, resulted eventually in an abnormally dry, shrunken lens; the other, apparently due largely to destruction of the lens cells lining the capsule, consisted essentially in undue admission of aqueous into the lens, and its results.

C. H. M.

THE SOLUTION OF SENILE CATARACT IN THE EARLY STAGES.—POLLOCK, W. B. INGLIS, Glasgow (*Report of the Annual Congress of the Ophth. Soc. United Kingdom, April, 1915, Medical Press, May 12, 1915*). In a consecutive series of 100 patients with senile cataract who were under treatment for not less than three months by means of alkaline lotions and dionine, fibrolysin and iodolyisin drops, 45 per cent. of the 178 eyes showed great improvement, and

41 per cent. an improvement in vision; 7 per cent. remained stationary. In 8 per cent. the treatment failed to arrest the progress of the cataract. The method did not cause pain, and could be persevered with over long periods. Attention should be directed to the general health, and the internal administration of an alkali was an advantage. Several patients had, he said, remained free of recurrence for a period of from three to six years. C. H. M.

FURTHER REMARKS ON THE ETIOLOGY OF SENILE CATARACT.—SCHANZ, F., Dresden (*Arch. f. Ophth.*, 89, p. 556), refers to the experiments of Chalupecky, Herzog, Wildmark and von Hess, who produced opacities of the lens by exposing guineapigs to the quartz lamp. Light changes the structure of albumen, so that easily soluble albumen becomes less soluble, as can be shown chemically by the nitroprussid reaction. From the less soluble albumen coagulated albumen is formed, which is perceived as opacity. According to Schanz the changes produced in the living animal by Chalupecky with the quartz lamp could only be brought about by rays also contained in daylight, especially the blue light of the sky, of which the plains are particularly rich in consequence of the diffusion of the light in the atmosphere. C. Z.

CONJUNCTIVA

SAMOAN CONJUNCTIVITIS.—ELY, C. F., United States Navy, Tutuila, American Samoa (*Ophth. Record*, September, 1914). A distinct, acute, infectious disease, characterized by rapid onset, severe pain, photophobia, a high grade of conjunctival inflammation, soon becoming purulent, a tendency to corneal destruction over greater or less areas, and the presence in the discharge, often in pure culture, of its etiological factor, a distinct micrococcus. Small micrococcus about .6 to .8 microns in diameter, often seen as diplococci, and when so seen markedly resembling Gonococci; the adjacent margin often being flattened. Stains readily with the usual stains. Is decolorized by Gram's method. (Control Staphylococcus P. A.) Takes Methyl Violet to nearly black. Grows readily on usual artificial culture media. Ely hopes to determine whether it is a separate nosological entity or trachoma. G. I. H.

PHLYCTENULAR CONJUNCTIVITIS, ITS IMPORTANCE IN THE CONSERVATION OF VISION.—KEY, BEN WITT, New York, N. Y. (*Ophth. Record*, June 1914). The author in conclusion states: 1. The

Etiology of phlyctenular conjunctivitis covers a broad field of medicine. It is therefore the more incumbent upon the physician, general practitioner and specialist to make a study of the individual case.

2. The course of the disease may be an indication of the general physical condition of the patient.

3. A differential diagnosis through thorough examination is expedient and imperative.

4. On close inspection of the facts, the sequellae of phlyctenular conjunctivitis and its complications are far-reaching in importance.

5. Care is the keynote to the proper management and treatment of cases.

The careful management of phlyctenular conjunctivitis is the profession's obligation in the struggle for the conservation of useful vision.

G. I. H.

A FURTHER REPORT ON PARINAUD'S CONJUNCTIVITIS.—KEIPER, GEO. F., LaFayette, Ind. (*Ophth. Record*, March, 1914). The question as to its etiology remains as obscure as ever. The syndrome of symptoms, the unilateral swelling of the eyelids and if the glands of the face and adjacent neck, together with the peculiar granulation of the palpebral conjunctiva, and moderate rise of temperature, makes the diagnosis easy. No other disease presents such an array of signs and symptoms.

As regards prognosis all cases to date have recovered with no damage to vision. No recurrences are reported. The reports indicate that it takes from two to six months to effect a cure.

As regards the treatment, since some reports seem to show a tubercular origin, tuberculin has been added to the list of remedies for the cure of the disease. "In all my own cases I made daily application of a two per cent. solution of nitrate of silver to the everted eyelids."

G. I. H.

A CASE OF "SQUIRREL PLAGUE" CONJUNCTIVITIS IN MAN.—VAIL, DERRICK T., Cincinnati, Ohio (*Ophth. Record*, October, 1914). It is believed that this is the first report of infection of the human eye from the virus of a plague-like disease among certain rodents, notably the California ground squirrel, and now known as "Squirrel Plague."

A man, age 28, a meat cutter, was affected in the left eye showing necrotic lymph nodes in conjunctiva and glandular involvement

of face and neck. The conjunctiva is riddled with about ten discrete deep, round, yellow necrotic ulcers, that run clear through the substantia propria of the conjunctiva quite to the tarsus. The ulcers appear punched out, but filled with golden yellow necrotic plugs. Sizes vary from 6.0 mm., the largest, which exists near the upper edge of the tarsus of the upper lid, to about 1.0 mm. The surrounding conjunctiva is deep red, very soggy and swollen, but does not bleed on being wiped with a wet cotton sponge. The necrotic plugs in the beds of the ulcers cannot be wiped away. The contrast between the deep red color of the conjunctiva and the brilliant golden color of the ulcers is as striking as a turkey-red calico dress with yellow "polka dots." G. I. H.

HYPERTROPHY OF THE CONJUNCTIVA.—SHOEMAKER, WILLIAM T., Philadelphia, Pa. (*Ophth. Record*, July, 1915). Colored boy, age 14. The case is of very long standing, and has not seemed to be inflammatory, in which case it might be a degeneration. "The possibility of belonging to that very rare variety of conjunctival disease known as hyaline, amyloid or colloid degeneration has been considered, but my limited knowledge of this condition would not justify more than a thought or two in this direction." G. I. H.

PEMPHIGUS OF THE CONJUNCTIVA.—STIEREN, EDWARD, Pittsburgh, Pa. (*Ophth. Record*, October, 1915). The author has observed only two cases of pemphigus of the conjunctiva in approximately 20,000 ophthalmic patients. In one case, a man, age 47, had a history of syphilis. In the second case a boy, age 6, contracted the ocular disease four weeks after he was vaccinated. Treatment is unsatisfactory in these cases. Bibliography given is exhaustive. G. I. H.

CORNEA

THE PREVENTIVE AND CURATIVE TREATMENT OF PNEUMOCOCCAL ULCER OF THE CORNEA.—RAMSAY, A. MAITLAND, Glasgow, England (*Ophth. Record*, September, 1915). First aid in such a case consists in washing out the conjunctival sac with a warm solution of boracic acid, instilling a few drops of a 2% solution of cocaine, examining the eye carefully by focal illumination, removing any foreign body from beneath the eyelids or from the surface of the cornea, applying an ointment of 1% atropine, 2% cocaine and 3% iodoform, and covering the eye with a carefully adjusted compress

and bandage. The patient ought then to be sent to a specialist, for it cannot be repeated too often, or urged too strongly that the sooner the eye is treated by an expert the more satisfactory will be the result.

The technique of treatment is as follows: Ethylhydrocuprein hydrochloride, also known by the trade name of optochin, a white salt readily soluble in water, is employed in 1% or 2% aqueous solution. Before it is used, the floor of the ulcer should be thoroughly washed with a lotion, containing chinisol (1 in 4,000), or quinine hydrochloride (3 grains to 1 fluid ounce), diluted with an equal quantity of warm water, and the boundaries of the ulcer should be demarcated by staining with an alkaline solution of fluorescein. This done, a swab of sterilized woolen cotton, sufficiently large enough to cover the whole of the ulcerated surface, and saturated with a 1% aqueous solution of the optochin, should be applied to the ulcer, and kept in firm contact with its floor and margin for about two minutes. Should the patient be sensitive, it is well to instill cocaine drops beforehand, because the application of the optochin causes sharp burning pain lasting from five to ten minutes. That irritation, however, soon lessens, and by the end of fifteen minutes there is complete anesthesia of the cornea, which will last for fully half an hour. To begin with these applications should be repeated two or three times daily, the good effect being maintained by instilling a few drops of 1 per cent solution of optochin every hour during the days, while, during the night, a 1% optochin and atropine ointment may be applied as often as possible without interfering with sleep. Ethylhydrocuprein is often applied by simple instillation alone, but the use of the swab and the hourly instillations combined will be found much more efficacious and satisfactory.

G. I. H.

KERATITIS CAUSED BY INFECTION WITH BACILLUS COLI.—MACLEISH, A. C., Los Angeles (*Arch. Ophth.*, July, 1915, XLIV, 403), refers to the publication by Mr. Arnold Lawson (*Trans. Ophthal. Soc. United Kingdom*, 1911), of two cases of metastatic ocular inflammation associated with bacillus coli which were cured by the administration of urinary antiseptics or by the addition of an autogeneus vaccine. The author believes this form of keratitis is not uncommon and has observed five such cases in his private practice. Each case showed a keratitis of a vesicular type, accompanied by a chronic cystitis or recurrent diarrhoea or both. Pure cultures of bacillus coli were obtained from the urine and in one

case from the anterior chamber. A description of the subjective and objective symptoms is given and a clinical history of the cases.

W. R. M.

GENERAL DISEASES AND THE EYE

CONJUNCTIVAL HEMORRHAGE IN TYPHOID.—LAYSON, Z. C., Hinton, W. Va. (*Ophth. Record*, July, 1914). Man, age 25, affected in right eye and the blood was from the conjunctiva tarsi of the upper lid. The hemorrhage was capillary and quite profuse. There was to be seen in the retinae four small areas of partly absorbed hemorrhage. No history of a hemorrhage diathesis was obtained.

G. I. H.

RECENT LITERATURE ON THE RELATIONS OF GENERAL DISEASES TO OPHTHALMOLOGY.—SMALL, CHARLES P., Chicago, Ill. (*Ophth. Record*, May, 1915). The author deals with the following: Diphtheria infection, cerebro-spinal meningitis, anthrax, gonorrhoeal infection, disturbance of internal secretion, intestinal toxemia, dental diseases and arteriosclerosis.

G. I. H.

IRITIS DUE TO INFLUENZA.—REBER, WENDELL, Philadelphia, Pa. (*Ophth. Record*, May, 1915). Man, age 34, affected in right eye. Influenza-mixed sero-bacterin (sensitized) was given with the usual good results.

G. I. H.

OCULAR PHENOMENA ACCOMPANYING THREE CASES OF GASTRO-INTESTINAL DISORDER.—WOODS, HIRAM, Baltimore, Md. (*Ophth. Record*, May, 1915). The cases are as follows: 1. Chronic uveitis, apparently traced, after two years, to alveolar absorption.

Case 2. Para-central color scotoma.

Case 3. Shifting toxic (?) scotoma.

The author states: First, all explanations are hypothetical; secondly, the problem involves knowledge of structure and functions of which we know very little. When we attempt to trace a path from an intestinal infection, even admitting existence of toxins, to perverted eye function or lesion, we are without a solid basis for reasoning. There remain only observed clinical facts; yet these facts are too suggestive to allow dismissal.

G. I. H.

THE CONSIDERATION OF SYSTEMIC DISEASES AFFECTING THE OCULAR TISSUES.—BRAWLEY, FRANK, Chicago, Ill. (*Ophth. Rec-*

ord, May, 1915). The author cites eight cases and in conclusion states "It would seem that we have at our command a very valuable weapon in these studies of metabolism. Unfortunately the internists who have proper laboratory facilities and who are properly trained for this work are few in number as yet, and exist at present chiefly among the specialists. The expense of the laboratory work alone is a large item, and when to this is added the fees of two specialists, the oculist and the internist, it is easily seen that such care is beyond the means of many patients. For these, the well equipped hospital offers a solution of the problem and incidentally a means for extending our researches along these lines. It is understood, of course, that the examination of these unusual eye cases includes a thorough study of the accessory nasal sinuses, tonsils, teeth, urinary tract, glandular system, etc., in order to exclude all possible sources of toxemia.

It does not seem possible that we shall ever be able to point to a given ocular lesion and state definitely that a certain toxin is the etiologic factor. This would seem to be as impossible as it would to account for the variety of skin areas involved in an eczema, a disease now believed to be chiefly the result of a general toxic process, or to account for the occurrence of a neuritis, or a so-called rheumatism in so many different locations. It is as rational a thing I believe to correct faults of metabolism in every individual whether ill or well, as it is to periodically overhaul your automobile, or to see that proper fuel and oil are provided. And certainly in the presence of disease in any part of the body the obvious course is to place that body in the highest state of efficiency and resistance by balancing up the processes of metabolism.

G. I. H.

PRIMARY SYPHILIS OF THE CONJUNCTIVA—FIBROMA OF THE ORBIT.—MATHEWSON, GEO. H., Montreal, Canada (*Ophthalm. Record*, July, 1915). Man, age 33, affected in the right eye. The ulcer was examined for spirochaetes, and found present in large numbers. Under salvarsan and mercury the ulcer and glandular swelling cleared up rapidly and completely, with but little local treatment.

Man, age 54, with tumor in right eye. The tumor, which was easily shelled out, was sharply defined from the surrounding tissues. It was irregular in shape, being roughly pear-shaped and about the size of a hen's egg, but flatter. Histologically it was

found by Dr. Rhea to be a pure fibroma. The tumor measured 3.5 mm. x 2 mm. x 2 mm. G. I. H.

ACUTE AXIAL OPTIC NEURITIS, AS AN EARLY SYMPTOM IN DISSEMINATED SCLEROSIS.—SHUMWAY, EDWARD A., Philadelphia, Pa. (*Ophth. Record*, August, 1915). The characteristic condition is central scotoma, with atrophy of the temporal half of the nerve, which does not go on to complete atrophy, as in tabes, but leaves a considerable amount of vision and is due to an involvement of the axial or papillo-macular fibers in the nerve. The author cites one case. G. I. H.

POST-OPERATIVE INSANITY WITH SPECIAL REFERENCE TO OPHTHALMIC CASES.—PFINGST, ADOLPH O., Louisville, Ky. (*Jour. Ophth. and Oto-Laryn.*, June, 1915). The author affirms that mental disturbances follow operations upon the eye more frequently than they do operations upon other parts of the body. That the severity of the operation also does not stand in any causative relation with the development of psychoses is evidenced by the frequency of disturbances after operations upon the eye, which as a rule are not severe. Pfingst reports two cases of psychoses following cataract operation. The following conclusions are offered:

First. That post-operative insanity does not occur in individuals mentally sound, that there is a pre-existing unstable nervous system and that the symptoms merely become manifest after the operation—the latter acting as the exciting cause.

Second. That the cases nearly all occur in senile subjects, and that younger subjects with analogous symptoms nearly always have atheromatous blood vessels or diseased kidneys.

Third. That the most probable cause of the predisposition lies in an atheromatous condition of the blood vessels and possibly in diseased kidneys with resulting intoxication—hence these cases are more properly senile or toxic (renal) insanities than post-operative or dark-room deliria.

Fourth. That all cases of mental aberration associated with hallucinations, etc., even though they be of short duration, may be looked upon as cases of true insanity—differing only in severity and nature of the symptoms.

Fifth. That psychoses may occur after any kind of operation, but that they are especially prone to follow operations upon the genitals and the eyes and more especially cataract operations.

Sixth. That insanity occurs perhaps once in every 400 to 600

cases of surgery, including ophthalmic surgery, and that it occurs once in about every 200 or 300 cases of cataract extraction.

Seventh. That the psychoses following ophthalmic surgery do not differ materially from those after general surgery.

Eighth. That many of the cases are of brief duration, 2 to 4 days, but that some last months or years, or the patients may even become permanently insane. A small percentage die as a result of the nervous affection.

G. I. H.

THE EYE SYMPTOMS IN KAPOSI'S DISEASE (XERODERMA PIGMENTOSUM). CROSS, F. RICHARDSON, Bristol, Eng. (*Report of 1915 annual meeting of Oph. Soc. United Kingdom. Med. Press, May 12, 1915*). In a general review of the disease the writer states that spots like freckles appeared in the first year or two of life, and were often precursors of the grave skin disease described by Kaposi in 1870, accompanied by dryness and atrophy of the skin, and other serious changes. Frequently more than one member of a family were affected. The prognosis was very gloomy: early death might occur from deep ulceration toward the brain or other vital parts; or from exhaustion or hemorrhage. The mucocutaneous surfaces, such as the eyelids, became thinned, shrunken, and fissured with superficial ulcers; and the eyeball might participate in any phase of the disease, and warts might occur on the lid edges. The ocular conjunctiva was usually hyperaemic. Some cases showed pterygium, and the cornea became hazy from infiltration of its substance, or from swelling of the epithelium. Exotropion was frequently present, leading to opacity or ulcer of cornea. But in many cases the eyes were open and light was well tolerated. The optic nerve and intraocular structures were affected only late, if at all. Massage of the eyeball, especially by the use of calomel ointment, served to empty the superficial blood vessels. One such case had been improved by X-rays; scraping the conjunctiva with a sharp spoon, followed by application of salicylic acid and irrigations with a solution of salicylate of sodium, had also been productive of good results. The writer gave the histories of two children having this disease, a mother and a sister whom he had had under observation during the past year.

C. H. M.

DOUBLE CHANCRE OF THE EYELID.—FINLAY, C. E., Havana, Cuba (*Arch. Ophth.*, July, 1915, XLIV, 410), reports a case of double chancre of the eyelid and refers to the published literature on that form of extragenital infection.

W. R. M.

ON THE SO-CALLED PRIMARY TUBERCULOSIS, AND THE CONJUNCTIVAL TUBERCULOSIS IN PATIENTS SUFFERING FROM LUPUS.—LUNDGAARD (*From the medical light institute of Finsen at Copenhagen. Klin. Mon. f. Aug.*, 55, p. 97), reports his observations on 48 patients, out of whom 19 did not have lupus of the skin, 29 were lupus patients.

One of the 19 had lupus of the nasal mucous membrane, another one was doubtful. All 19 cases were unilateral. One had tuberculosis of the ocular conjunctiva, the others only tuberculosis of the palpebral conjunctiva. In 15 cases there was marked swelling of the preauricular glands, often with participation of the submaxillary and retromaxillary glands. In 12 cases the preauricular glands showed intense disintegration and had to be incised and scraped.

Primary tuberculosis is exclusively found in young individuals under 20 years. The frequency rises from 1 to 5 years to the age of from 15 to 20 years, in concordance with surgical tuberculosis. It is much more frequent in females. The upper lid is more frequently affected than the lower. The first symptom is the swelling of the glands, not rarely before anything pathological is seen on the conjunctiva. The ocular conjunctiva is injected, the palpebral conjunctiva to a large extent thickened, shows miliary granules, similar to lymph follicles. Sometimes irregular ulcerations are found, covered with yellowish gray secretion. L. assumes an endogenous etiology through the blood vessels and lymphatics. He thinks that the importance of tuberculosis of the nasal cavity and the tear passages as sources of tuberculous infection of the conjunctiva has been overrated, as none of his 19 cases showed an affection of the tear duct. All primary cases were cured by Finsen light, which L. considers superior to any other method of treatment.

In the lupus patients the age of from 1 to 5 years is spared, but the conjunctival affection is observed up to the age of from 51 to 55, most frequently between 26 and 30. The sex is irrelevant. The affection often is bilateral. The upper lid is more frequently diseased than the lower. Swelling of the lymphatic glands is doubtful, at least they never show destruction. The subjective ailments are slight, and the patient may be affected for a long time without noticing it, as there is only slight swelling and minimal secretion. Most frequently the conjunctiva shows coarse, granulating, easily bleeding ulcerations and crested or fungiform excrescences and scars. Lupous conjunctivitis seems to be of

ectogenous origin. Also in the lupous cases Finsen treatment was successful except in a few, in which it could not be carried through on account of shrinking or lupous changes in the surroundings of the eyes. C. Z.

GLAUCOMA

THE SCLEROCORNEAL SETON IN THE TREATMENT OF GLAUCOMA.—WOOD, CASEY A., Chicago (*Ophth. Record*, May, 1915). A capillary drainage of the anterior chamber as will insure a uniform and permanent outlet for the pent-up intraocular fluids—that chief desideratum in the treatment of chronic glaucoma.

A narrow Graefe knife, with a hole near its point, is introduced and passed in precisely the same fashion as in the preliminary steps of an anterior sclerotomy. The puncture and counter-puncture are made entirely in the sclera, but as near the clear corneal margin as possible, so that at least one-half the operative wound communicates with the anterior chamber. When the point of the instrument emerges from the globe at the counter-puncture one needle of a double-armed, white, "oo," braided, silk suture, about eight inches long, is passed through the hole in the knife point. After a number of trials it was found that a half-curved needle is better adapted to the purpose than a straight one. It should be just large enough to pass easily through the eye of the knife, and should not be more than two-thirds of an inch long. Thus armed, the knife is withdrawn, so that about the same lengths of double suture protrude from puncture and counter-puncture. The knife is now freed from the sutures with scissors, and the first needles are with a needle-holder separately passed (by way of the counter-puncture wound) in different directions and for the length of the needle, beneath the ocular conjunctiva. The loose ends of suture corresponding to the puncture opening are then threaded and the same maneuver is practiced on that side. The so-called split- or patent-eye needle is most useful here, since a wet, sterilized suture can be immediately threaded upon it; otherwise valuable time is sure to be lost in vain attempts to pass damp thread through the eye of the ordinary needle. G. I. H.

THE LAGRANGE SCLERECTOMY AND THE ELLIOT TREPHINE OPERATION.—MELLER, JOSEF, Vienna (*Ophth. Record*, July, 1914). This paper is a report based upon the results of 389 Lagrange operations and 178 trephine operations. Meller's sta-

tistics show 1.5% of late infection after the Lagrange and 1.7% after the Elliot trephining. The author answers the question, "Is the Graefe iridectomy to be entirely displaced by scleral trephining?" This question seems to presuppose a great difference between the two methods of operation, as is in fact the case. Scleral trephining is so to speak a convenient, technically easier and less dangerous way of obtaining access to the iris in order to excise it at its root after the dictum of von Graefe. That the fistulization of the eye secured by it at the same time represents an additional curative factor forms certainly an advantage of trephining which is not to be underestimated, and which is especially adapted to those cases of glaucoma (for example to glaucoma simplex) in which the usual iridectomy can not be depended upon. The skilled operator will stick to the approved Graefe iridectomy in those cases of glaucoma in which this operation, as has been proven, almost always produces the desired effect, but he will prefer to trephine in the cases of high intraocular pressure, advanced degree of glaucoma, complicated cases of secondary glaucoma, etc.

G. I. H.

ELLIOT'S TREPHINING AND CYCLODIALYSIS.—KRAUPA, E. Tep-litz (*Centralbl. f. Aug.*, 39, p. 171), ascribes to the scar after Elliot's operation only a temporary value, which as long as an actual fistula remains relieves the eye and enables it to develop new outlets or to render the old ones again serviceable, whereby the iridectomy plays a part. If this does not take place, the fistula closes and the glaucoma recurs. K. observed this in three cases, which are reported. After performance of cyclodialysis in these cases the final result was good. Therefore K. recommends after unsuccessful Elliot's operation not a second trephining, but cyclodialysis.

C. Z.

LATE INFECTION FOLLOWING CORNEA-SCLERAL TREPHINING.—CROUCH, J. F. and CLAPP, C. A., Baltimore, Md. (*Ophth. Record*, October, 1915). The following points are of interest in this case. The time which had expired since the operation (13 months), showing that the infection must have penetrated the conjunctiva, as no fistula would have remained that length of time. Secondly, the youth of the patient (25 years old), and thirdly, the myopic condition with stretching. The recurrence of glaucoma is infrequent in either condition.

G. I. H.

AN OPERATION FOR GLAUCOMA—FILTRATION SECURED BY A LEECH-BITE INCISION.—TODD, FRANK C., Minneapolis (*Ann. Ophth.*, July 1915). The writer's experience with Elliot's operation in 59 patients has led him to believe that in certain cases a lesser operation producing a smaller opening would be better. He had previously performed several Herbert's operations but found this procedure difficult. He has devised a knife which makes a leech-bite incision, i. e., three lines proceeding from a central point thus producing three flaps—an incision very difficult to close; this remains open, allows satisfactory filtration under the conjunctiva, but since no scleral tissue is removed there is no weakening of the sclera and consequently less liability to protrusion of the ciliary body into the opening with danger of more or less subsequent disaster including late infection.

In performing the operation with this instrument a conjunctival flap may be dissected up, or the knife may be shoved under the conjunctiva well above the margin of the cornea. The point of the knife may then be slid along between the conjunctiva and sclera until it reaches within two or three millimeters of the cornea, when it should penetrate the sclera and enter the anterior chamber, being as quickly withdrawn. If prolapse occurs, iridectomy is performed. The operation is very simple and may be very quickly performed. It is not intended to replace the Elliot operation; but the writer believes that the Elliot operation is not suitable in all cases and that, in certain cases, the procedure suggested by him is the safer.

C. H. M.

THE COLLOIDAL THEORY OF THE PATHOLOGY OF GLAUCOMA.—MCCAW, JOHN ALEXANDER, University of Colorado (*Ophth. Record*, June, 1915). This is the author's thesis for the Degree of Doctor of Ophthalmology, University of Colorado. The problem is to test by experiment the colloidal theory of glaucoma as advanced by Martin Fischer. "Just what the chemical changes in the eye are in clinical cases of glaucoma, no one is able to state definitely. We may infer that the cause of this oedema is the same in the essentials as that of the more general ones. In a large number of glaucoma cases circulatory disturbances in the eye which permit of an accumulation of carbon dioxide and the abnormal development of such acids as are a constant accompaniment of states of lack of oxygen, are unquestionably present." G. I. H.

....GLAUCOMA AS A CONTRIBUTING ETIOLOGICAL FACTOR IN INSANITY WITH REPORT OF A CASE.—WELTON, CARROL B., Peoria, Ill. (*Ophth. Record*, May, 1914). The patient developed a glaucoma, the disease was not recognized by the family physician and she never at any time was examined by an oculist. Her physician administered opiates for several months, to relieve the intense pain in the eyes, until she became absolutely blind. Her mind then became affected, she was adjudged insane, and committed to an insane asylum, where she now remains. G. I. H.

ON GLAUCOMA. V. IS VENOUS STASIS THE CAUSE OF HEMORRHAGIC-FIBRINOUS TRANSUDATION FROM THE VASCULAR TUNIC OF THE EYE, WHICH FREQUENTLY COMPLICATES THE OPERATIONS WITH FORMATION OF FISTULAS AGAINST CHRONIC GLAUCOMA?—HEERFORDT, C. F., Copenhagen (*Arch. f. Ophth.*, 89, p. 484), observed in about one-half of his cases a disposition to the formation of posterior synechiae and hyphema, in concordance with other authors. There are also observations of deposits of uveal pigment in the fistula leading from the anterior chamber to the subconjunctiva. H. shows that the uveal hemorrhagic fibrinous transudative process, frequently complicating the trephining of eyes affected with chronic glaucoma, is most naturally explained by venous stasis. C. Z.

INJURIES

EYE PROTECTION FOR GRINDERS AND MACHINISTS.—DAVIE, H. W., Chicago, Ill. (*Ophth. Record*, October, 1915). The Pullman Company's accident charts show that 35 per cent of all injuries are eye injuries. After most exhaustive tests as to the best way of protecting grinder's eyes, it has been proved beyond doubt that side guards should be provided on the glasses. G. I. H.

A CASE OF BI-LATERAL SUBCONJUNCTIVAL HEMORRHAGE APPARENTLY DUE TO CENTRIFUGAL FORCE.—BRADBURN, A. A., Manchester, England (*Ophth. Record*, July, 1915). Girl, age 21. The vision and fundi were normal. In the performance of her feat she was suspended, by a belt around the waist, from a strap which a fellow acrobat grasped between the teeth whilst hanging from a trapeze. The patient is then rapidly spun from left to right about three dozen times, around a vertical axis, which motion obviously drives the blood to her extremities and is sufficient to account for

the occurrence of the hemorrhage and its appearance first in the right eye and later in the left.

G. I. H.

A CASE OF TRAUMATIC ENOPHTHALMOS.—HANSELL, HOWARD F., Philadelphia, Pa. (*Ophth. Record*, May, 1915). The important symptom in this case was the partial failure and impending loss of vision. Fracture of the orbital walls or apex other than the lower outer margin as mentioned above was excluded by radiographs—a most significant factor in the prognosis. Laceration of or pressure upon the optic nerve by fragments of bone means total loss of vision from optic nerve atrophy. Pressure by exudation or blood or traction by cicatricial bands offers a chance for a more favorable outcome. Enophthalmos of moderate degree in itself is not serious. The deformity, the restricted movement and the diplopia are not comparable in importance with optic nerve atrophy.

G. I. H.

PENETRATING INJURY TO THE EYE FROM BROKEN SPECTACLE GLASS.—STEPHENSON, SYDNEY, London, Eng. (*The Lancet*, July 10, 1915). The writer gives the history of a patient who suffered from a perforating wound of the cornea inflicted by a piece of broken lens, her glasses having been smashed as a result of an accident. He points out that injuries to the eye by broken spectacle lenses are admittedly rare. Hans Lauber, among 150,000 ophthalmic patients, found 5 (or 1 in 30,000) who had sustained this kind of accident. Such accidents as a rule are of a description to which people are exposed but exceptionally. For example, in the five cases related by Lauber the injury resulted from a railway collision, the explosion of an acetylene lamp, a knock against a metal wardrobe-number, a blow from a ball, and an injury from an animal's hoof. It has even been suggested that glasses may sometimes protect the eyes from injury either by diminishing the force of a blow or by changing its original direction. A case is known, indeed, where a chip of metal, weighing 600 milligrams, had shattered the glasses, but left the eye beneath intact (Hirschberg). Lauber believes that spectacles are, speaking generally, more dangerous than eyeglasses, inasmuch as the latter drop off more readily than the former. The question as between framed and rimless spectacles or eyeglasses is more difficult to decide, since those most exposed to injuries seldom wear the rimless forms. Of the ten cases of injury to the eye by broken lenses, one was in a child, one in an old man, and the remainder in young men.

C. H. M.

AN UNUSUALLY HAPPY RESULT FOLLOWING THE REMOVAL OF AN INTRAOCULAR FOREIGN BODY WHICH HAD BEEN IN THE EYE NEARLY FOUR MONTHS.—ELWOOD, CALVIN R., Menominee, Mich. (*Ophth. Record*, September, 1915). A radiograph showed an intraocular foreign body, which was floating in the vitreous. A scleral incision was made and the foreign body, which proved to be a piece of steel, 4x2 mm. in its largest diameters, was easily removed. The wound was closed by a conjunctival flap, and the usual after treatment employed. The patient made a prompt recovery, wanted to go back to work long before permission was granted. Vision is the same in both eyes (20/15—1). There was absolutely no discomfort, excepting for two small floating opacities which are much smaller than formerly. G. I. H.

REPORT OF A CASE WITH A FOREIGN BODY LOCATED IN THE LENS.—ALTER, FRANCIS W., Toledo, Ohio (*Ophth. Record*, September, 1915). The author states where the foreign body is located in the lens, the procedure is to do an extraction and remove the lens and foreign body together. There is much less danger to the eye when this is done than when one attempts to remove the foreign body first and later perform an extraction of the lens. G. I. H.

BIRTH INJURIES OF THE EYE. REPORT OF A CASE PRESENTING A RUPTURE OF DESCMET'S MEMBRANE.—SMALL, CHAS. P., Chicago, Ill. (*Ophth. Record*, August, 1915). Patient, age 11, presents three distinct linear opacities extending vertically across the entire right cornea. In addition to the corneal injury there is a partial opaque lens, dislocated upwards. There is a tremulous iris which accompanies this condition. There is atrophy of the optic nerve and a slightly increased intraocular tension. Vision is reduced to counting fingers at four inches. The lower edge of the lens seems to be less curved than it usually appears in this condition, and much darker in color than the remaining portion of the lens. Also scar on lower eyelid. G. I. H.

ANNULAR OPACITY OF THE LENS, FOLLOWING A PENETRATING WOUND INTO THE VITREOUS CHAMBER.—HOLLOWAY, T. B., Philadelphia, Pa. (*Ophth. Record*, August, 1915). The author cites two cases and gives the bibliography extant. G. I. H.

A CASE OF GONORRHEAL IRITIS FOLLOWING TRAUMATISM.—LAMB, ROBERT SCOTT, Washington, D. C. (*Ophth. Record*, July,

1915). Man, age 32, injury in left eye. Local treatment was the administration of drops of 1% atropin and 5% dionin, every three hours, to be followed by hot applications. Sensitized bacterine used immediately with splendid results. G. I. H.

ENUCLEATION AND EXENTERATION OF WOUNDED EYES IN THE FIELD.—DEUTSCHMANN, R., Hamburg (*Muench. Med. Woch.*, October 26, 1915). The best treatment of a badly injured eye in the field is the removal of the offending organ, either by enucleation or exenteration. The latter is the operation of necessity when the original wound of the eye is not firmly closed, so that there is danger of rupture of the globe during the operation, or in the presence of an acute panophthalmitis. The danger of sympathetic ophthalmia following this operation is minimized, provided care be taken to remove all adherent particles of choroid. D. advises against tamponage of an exenterated globe, on the score of delayed healing and painful removal of the tamponade. H. S. G.

ON WAR INJURIES OF THE EYE AND OCULISTIC ATTENDANCE OF THE TROOPS.—HIRSCHFELD, A., Koenigsberg (*Zeit. f. Aug.*, 33, p. 266), gives a very good synopsis of his observations of injuries and diseases of the eye during the war, and emphasizes the importance of providing the troops with consulting ophthalmologists, not only for proper treatment of eye injuries, but also for increasing the efficiency of the men in the field by refractometric examinations and ordering and supplanting of proper glasses, and gives recommendations for such organizations. C. Z.

ON OPERATIVE EXPERIENCES IN WAR INJURIES OF THE EYE.—IGERSHEIMER, J., Halle (*Klin. Mon. f. Aug.*, 54, p. 585), reports several cases. The first patient lost one eye by panophthalmitis, the other eye showed cataract with hemeralopia and defects of the visual field. After discission and linear extraction V rose to 5/7. Hence I. concluded that in patients, injured in the war, if they have only one eye left, the operation for cataract ought to be attempted in spite of wrong projection.

In a second group of cases of injuries of the lids with loss of the eyeball I. succeeded by plastic operations in forming a conjunctival socket, so that a prothesis could be worn. For avoiding complications I. advises examination with Roentgen rays and examination of the nasal sinuses, previous to plastic operations in the surroundings of the eye.

The last group comprises injuries of the orbit, partly with intracranial complications. In all these gunshot injuries traversing the orbit so that also the orbital roof was affected it was very remarkable that the destructions always were much greater than the symptoms at first indicated. After the roof was splintered. From this follows that in such injuries a very doubtful prognosis must be given, even if the patient feels well for months. The intense devastations of the walls of the frontal sinus and the danger of purulent affections of the frontal and ethmoidal sinuses with prolapsed or defective dura require a careful examination with Roentgen rays.

C. Z.

LYMPHOCYTOSIS AND EYE INJURIES.—FRANKE, E., and HACK, R., Hirschberg (*Arch. f. Ophth.*, 89, p. 450), examined 40 cases of injuries of the eyes, 37 older and 3 recent, with regard to lymphocytosis, with the result that lymphocytosis is found in a large series of injuries of the eyes, in which the injured eye had remained quiet for years and in which the danger of sympathetic ophthalmitis seems excluded. In concordance with the experiences of von Hoesslin and Sauer, who never missed symptoms of neurasthenia in cases of lymphocytosis, the present authors conclude that the lymphocytosis is not a consequence of the eye injury, but of simultaneous neurasthenia. Hence the presence of lymphocytosis may be valuable for the distinction of simulation from neurasthenic conditions.

C. Z.

TWO CASES OF PARALYSIS OF THE CERVICAL SYMPATHETIC NERVE WITH OCULAR SYMPTOMS AFTER INJURIES SUSTAINED IN THE WAR.—RUSSEFF, KOSTA (*From the eye clinic of Prof. R. Greeff in the Charité at Berlin. Zeit. f. Aug.*, 33, p. 291), reports, after a review of the relation between physiological experiments and clinical observations, two cases.

The first showed after a lesion of the brachial plexus at its exit on the left side of the neck Horner's complex of symptoms: ptosis, miosis, and enophthalmus, on the right side, paralysis of the cervical sympathetic nerve and of the recurrens of the left side.

Case 2: Injury of the right shoulder joint without consequences, Horner's complex of symptoms from pressure and irritation by a hematoma on the cervical spinal cord with transitory compression and circumscribed cervical myelitis, lesion of the left brachial plexus at its exit.

After a detailed discussion R. reaches the following conclusions:

Horner's complex of symptoms occurs partly in form of irritation, partly in form of paralysis, in consequence of compression or lesion of the cervical sympathetic nerve or of its central paths. The form depends on the duration of the acting cause and the time elapsed. The complex need not always be present in traumatic lesion of the brachial plexus. It is rather in near relation to the place of injury and depends upon whether circumscribed myelitis develops or not. Hence early and late symptoms must be distinguished. Twelve cases from literature are tabulated.

C. Z.

SHRAPNEL WOUND OF THE OCCIPITAL REGION WITH INVOLVEMENT OF THE VISUAL CENTERS.—WOOD, CASEY A., Chicago, Ill. (*Ophth. Record*, August, 1915). The patient's pupillary reactions, ocular tension, muscle balance and the external appearances of the eye are all normal. On dilating his pupils and scanning the fundi he presents a few white, very small dotted exudates scattered over both fundi, in addition to slight myopic changes. On the right side just above the disc is what appears to be the remains of an old hemorrhage. The important alterations in the fundi are, however, a definite blurring of the outlines of both nerve-heads, with obscuration of the physiological cups and loss of transparency in and swelling of the papillary tissues. The retinal vessels, both veins and arteries, are engorged and slightly tortuous. In fact, the picture is that of a recent, though receding, mild, bilateral papillitis. The fields of vision (two examinations at a week's interval gave almost identical charts) are shown in the illustrations. The areas, especially on the left side, for white, red and green, are decidedly contracted.

G. I. H.

INSTRUMENTS AND METHODS OF EXAMINATION

THE USE OF THE SIDEROSCOPE FOR DETECTING IRON IN THE EYE.—BANE, WM. C., Denver, Colo. (*Journ. Ophth. and Oto-Laryng.*, October, 1915). The author agrees that of all the tests for metallic bodies in the eye the X-ray is certainly the most reliable, but not all patients will submit to the expense of an X-ray examination.

G. I. H.

A NEW HAND CAMPIMETER.—PETER, LUTHER C., Philadelphia, Pa. (*Ophth. Record*, July, 1915). It consists of a blackboard fourteen inches square, to the bottom of which is attached a metal quadrant of a circle with a radius of six and a half inches, or

approximately one-sixth of a meter. The upper end of the quadrant is shaped to the lower eyelid and cheek, and is directly opposite the central point of fixation on the board. The instrument is supported by a handle, and is easily held in position by the patient.

It is not intended to replace the arc perimeter or campimeter of usual size. It is, however, especially designed to study the central field up to forty-five degrees, and as it includes practically the entire color field of a normal individual, the instrument may be used in a large number of pathologic cases heretofore studied on the large campimeter or arc perimeter.

G. I. H.

NEW RETRACTOR FOR EXTIRPATION OF THE TEAR SAC OPERATION, EXTERIOR FRONTAL SINUS OPERATION AND INFANT MASTOID OPERATION.—VAIL, DERRICK T., Cincinnati, Ohio (*Ophth. Record*, July, 1915). It is constructed from Allport's mastoid retractor, the working ends of which were removed and swinging "hands" substituted. Victor Mueller & Company, of Chicago, are the makers.

G. I. H.

AN IMPROVED HATPIN FOR VISUAL FIELD.—MADDOX, ERNEST E., Bournemouth, England (*Ophth. Record*, June, 1915). A white-headed hatpin makes an excellent test object, but as used at present, the movement of the hand which holds it is also visible and may defeat anything like a quantitative test. The little cylinder of wood, cork or rubber tube about half an inch long and of the thickness of a lead pencil, held between the finger and thumb enables the hand to be kept perfectly stationary and yet allows the head of the pin to make considerable excursions with an almost insensible movement of the thumb and forefinger.

G. I. H.

A SET OF LACRIMAL PROBES.—WEIDLER, WALTER BAER, New York, N. Y. (*Ophth. Record*, March, 1914). The probes possess the regulation handle of many of the ophthalmological instruments which we use daily, thus making it easier to handle and control. This sort of a handle gives three or more points of contact, thus making it quite a simple matter to readily balance and maintain complete control of the instrument. It does not require "gripping" in order to secure an assurance of control.

G. I. H.

THE CLINOSCOPE AS A GUIDE TO OPERATIVE EYE WORK. WITH AN EXAMPLE.—EATON, F. B., Portland Ore. (*Ophth. Record*, April, 1914). An attempt is here made to demonstrate the truth

and practicalness of applying certain physiological facts and certain methods of detecting the anomalous declinations of the human eye, and the surgical principles involved in their correction by operation.

G. I. H.

A KERATOME WHICH FACILITATES THE ELLIOT TREPHINING OPERATION.—JOBSON, G. B., Franklin, Pa. (*Ophth. Record*, May, 1914). The flap is turned over the cornea, and dissected with the keratome down to the corneal margin, and the epithelial and outer corneal layers are undermined for about 2 millimeters, being careful not to enter the anterior chamber.

G. I. H.

A NEW PAIR OF LID RETRACTORS FOR THE CATARACT OPERATION.—VAIL, DERRICK T., Cincinnati, Ohio (*Ophth. Record*, May, 1915). There is a heart-shaped guard near the bend of the instrument, which is designed for the purpose of keeping the lashes from fouling the instruments that are used in the operation. One of the principal advantages in the retractor holding the upper eyelid is that the lid hangs on a single bar, so that there is a gable-like exposure above the eyeball, which gives the operator the greatest possible field.

G. I. H.

SHIELD FOR GRAEFE CATARACT KNIFE AND ANGULAR KERATOME.—LEWIS, F. PARK, Buffalo, N. Y. (*Ophth. Record*, March, 1914). To protect them the writer has had shields made into which the instruments slip and in which they may be left when carried in the case and through the process of sterilization.

G. I. H.

A FORM AND COLOR TEST OBJECT FOR PERIMETRIC WORK.—PETER, LUTHER C., Philadelphia (*Arch. Ophth.*, July, 1915, XLIV, 416), describes a form and color test consisting of a small oval disc in which are contained white, red, green and blue discs in sizes varying from one and a half to ten millimeters. The changing of the colors is controlled by a small slide in the handle and the size of the disc is regulated by a milled wheel in which the varying sized diaphragms are contained.

W. R. M.

A SIMPLE PLATOSCOPE.—ZOTIL, O. (*From the Physiological Institute in the University of Graz. Zeit f. Sinnes phys.*, 49, p. 85). The old method of artists of looking at plane pictures with one eye through the hand closed like a tube has three advantages:

greater brightness and distinctness and especially plastic appearance. The two first advantages can be easily explained by the exclusion of lateral and perverse light. Z. explains the greater plasticity by the exclusion of the surroundings of the picture, which furnish very effectful elements for rendering the planeness of the picture more striking. If they are eliminated the motives in the picture for a conception of the represented third dimension are fully and without disturbance called into action and produce the surprising plastic effect. On this principle Z. constructed his plastoscope for this purpose, which consists of a tube 8 cm. long, blackened inside, with an eye piece shaped for attachment to the orbit. C. Z.

THE AZO-PROJECTION LAMP (HALF WATT LAMP) OF THE GERMAN AUER COMPANY, A SUBSTITUTE FOR NERNST LIGHT.—STÄHLI, J. (*From the eye clinic of Prof. O. Haab in the University of Zürich. Klin. Mon. f. Aug.*, 54, p. 685), describes this lamp and its advantages. It is superior and much cheaper (9 Mark) than the Nernst slit lamp, which costs 195 Mark. It allows of seeing (on oblique illumination with Hartneek's globular lamp) the coarser nerves of the cornea and their dichotomic ramifications, the mosaic of the epithelia, the fine deposits on the posterior surface of the cornea in any case of iridocyclitis, the finest remnants of the fetal pupillary membrane, dotted opacities of the lens and vitreous and pigment defects of the posterior layer of the iris. The lamp burns about 400 hours. C. Z.

GLASS LID RETRACTORS.—STUMPF (*Muench. Med. Woch.* No. 23). Lid retractors of heavy glass, similar in shape to the Desmattes. H. S. G.

IRIS

SUDDEN IRIDOPLEGIA AS THE FIRST SIGN OF METASTATIC OPHTHALMIA.—PICHLER, K., Klagenfurt (*Klin. Mon. f. Aug.*, 54, p. 682), observed in three cases, two of pneumonia and one of septicopyemia, sudden mydriasis and paralysis of the sphincter as the first symptoms of an inflammation of the eye. C. Z.

LACRIMAL APPARATUS.

AN OPERATION FOR THE DIRECT DRAINAGE OF THE LACRIMAL SAC INTO MIDDLE MEATUS FROM THE STANDPOINT OF THE OPHTHALMOLOGIST.—PRINCE, A. E., Springfield, Ill. (*Ophth. Record*,

August, 1915). It is the belief of the author that every oculist will appreciate a technic which will enable him, unassisted by the rhinologist, to drain the sac into the middle meatus, at the same time avoiding the handicap of the external operation on the face, with the possibility of a scar, or the possibility of a subsequent operation on the lacrimal gland to control the excessive lacrymal secretion, and also a technic which may be executed in the presence of an active phlegmon. Prince gives the various steps in the operation.

G. I. H.

TOTI'S OPERATION FOR DACRYOCYSTITIS, WITH THE REPORT OF TWELVE CASES.—RAIA, V. L., Providence, R. I. (*Ann. Ophth.*, July, 1915). The writer describes the different steps of this operation and reports the histories of 12 cases of dacryocystitis upon which he operated by this method. Eight of these were entirely cured at the end of three weeks; two were greatly improved after six weeks; one required probing for some weeks and then epiphora became very slight, and one got decidedly worse. He prefers local to general anaesthesia in the adult. He believes that a comparison with other methods will give this operation a high percentage of cures and improvements.

C. H. M.

A CASE OF LACRIMAL ADENITIS.—JEFFREY, ERIC, Sydney (*Med. Journ. of Australia*, August 7, 1915). A schoolboy, aged 7 years, came to the casualty room of the Moorecliff Eye Hospital on June 10, 1915, complaining of pain and swelling in his left eye. The symptoms had been present for a week.

On examination, the upper lid was seen to be in a state of ptosis and to be slightly cyanosed in its outer half. On palpation, a structure of moderately tense consistency, with well-defined edges extending down and covering the upper and outer quadrant of the cornea was felt. This swelling was slightly tender, but not extremely so. The mass was confined to the outer half of the upper lid, and seemed to be prolapsed from under the supra-orbital ridge, as no superior edge could be felt. The conjunctiva was somewhat injected, but in all other respects the eye was normal. The vision was not impaired when the lid was raised from the cornea. When the lid was everted, it was seen quite plainly that the ptosis was due to the mass pushing the upper lid downwards in the region of the outer half of the superior fornix of the conjunctiva.

A provisional diagnosis of lacrimal adenitis was made, and the patient was referred to the Ophthalmic Out-patient Department

of the Sydney Hospital. Next day he returned to Moorecliff with a diagnosis of pus beneath the upper lid; but a careful examination failed to reveal any evidence of suppuration. Treatment with fomentations and argyrol was instituted. The improvement was rapid. The mass, which proved to be an inflamed process of the lacrimal gland, receded within a few days beneath the supra-orbital ridge, and was soon no longer palpable. There were no marked constitutional signs at any period of the affection, and no evidence of other glandular involvement was obtained. F. P. M.

SUTURE OF THE LACRIMAL CANALICULI.—ELSCHNIG, A., Prag (*Klin. Mon. f. Aug.*, 55, p. 144), devised the following method of reuniting the severed lacrimal canaliculus. After stopping the hemorrhage, eventually by adrenalin, a thin caoutchouc probe, about No. 1 Bowman, is introduced into the tearpoint and the peripheral end and carried 10 mm. out of the wound. The nasal rest of the lid is grasped on the epidermal and conjunctival sides with two forceps and stretched so that the nasal piece of the canaliculus is exposed. A silk thread is introduced through the conjunctiva from close to the posterior wall of the lateral end to a corresponding point of the conjunctiva behind the nasal end and a similar suture through the skin at the anterior walls of both canalicular ends, but not closed. The probe introduced into the lateral end is now inserted into the nasal portion to the tear sac, and both sutures are closed. The remaining wound of the lid is united by sutures. The probe is cut off, so that 2 cm. project from the tear point. A piece of gauze, impregnated with vaseline, is placed into the inner angle of the lids behind the probe and a binocular bandage applied, which remains for from two to three days. The sutures are removed on the sixth, and the probe on the seventh day. E. performed the operation in five cases with perfect success. C. Z.

LENS.

SPONTANEOUS DISLOCATION OF A SCLEROSSED LENS INTO THE ANTERIOR CHAMBER.—KRAUSS, FREDERICK, Philadelphia (*Ophth. Record*, August, 1915). The microscopic sections of the dislocated lens, demonstrated that both anterior and posterior capsule were present, showing that the rupture had occurred at the zonula.

G. I. H.

CONGENITAL APHAKIA.—HARDY, WM. F., St. Louis, Mo. (*Ophth. Record*, July, 1915). Previous authors have not accorded a distinct place to aphakia among congenital anomalies, and this action is probably due to the doubt of genuineness in the cases reported, or because of the overshadowing concomitant defects. While congenital aphakia should receive mention under the subject of the lens, it is questionable if enough evidence is at hand to justify classifying it among true congenital anomalies, especially if one adheres rigidly to the interpretation of an anomaly as a non- or maldevelopment, and not a result of distinctly pathological processes.

G. I. H.

ANTERIOR LENS-RING FOLLOWING CONTUSION REPORT OF A CASE, WITH THEORY RELATIVE TO ITS PATHOLOGY.—CATES, THOS. H., Little Rock, Ark. (*Ophth. Record*, May, 1915). Female, age 19, had been struck in the left eye by a rock. The author asks, "May we not consider it likely that tiny particles of matter pressed from the posterior epithelial layer of the iris, mostly at the site of the ring, and migrating to various parts of the lens surface, often not themselves of sufficient size to be easily seen, may, by their presence as foreign bodies, excite superficial changes at these points, resulting in larger granular opacities that are more readily observed?"

G. I. H.

ON THE BEHAVIOR OF THE ZONULA FIBRES IN ECTOPIA LENTIS.—HEGNER, C. A. (From the eye clinic of Prof. W. Stock in the University of Jena. *Klin. Mon. f. Aug.*, 55, p. 22), reports his systematic examinations, with the Nernst slit lamp, of 9 cases, which have been under clinical observation for many years. In 6 cases the ectopia lentis was characterized by eccentric position of the lens, the zonular being intact. There were no other congenital anomalies. In these cases in which the ectopia is not due to defects of the suspensory ligament the affection has not progressed and, although a gradual lesion of the zonula may occur in consequence of the mobility of the lens, as one case showed that had been under observation for 26 years, this form of congenital ectopia of the lens seems to have a great inclination to remain stationary.

In 3 cases the other type was found: no intact zonular fibres or a few floating remnants. They were combined with other malformations of the eye, viz., intense corectopia upward in one, extensive reticular pupillary membrane covering the whole pupil of one and 2/3 of it in the other. As usual in these cases the lens was dis-

placed downward. Through constant downward movement finally the dislocation becomes total. This was observed in a girl, aged 12, in the course of 4 years. C. Z.

ON THE DEPENDENCE OF THE GROWTH OF THE LENS UPON THE ZONULA ZINNI.—HEGNER, C. A. (From the eyeclinic of Prof. W. Stock in the University of Jena. *Klin. Mon. f. Aug.*, 55, p. 39), observed in a girl, aged 20, a partial arrest in the growth of the lens after an iridectomy at the age of 6. At the coloboma the border of the lens was flattened and the diameter of the lens shortened. With the Nernst slit lamp H. distinctly saw that here all anterior zonular fibres were lacking, while a regular uninterrupted series of posterior zonular fibres persisted. This condition corroborated the conclusions of Wessely, drawn from his experiments. Apparently the anterior fibres of the suspensory ligament were injured by the operation. The cause of this disturbance of development lies in a mere mechanical effect, viz. the changed tension of the zonula. The growth of the lens takes place through apposition by the conversion of meridional cells into lens fibres from the equator of the lens. The arrangement of the new formed lenticular cells is influenced by a constant mechanical traction from the tension of the zonula. This is disturbed in its uniformity if at any place the tension of the zonula is changed. Where the tension is least the nuclei will stay back from the regular array: a flattening of the lens border results or in graver cases a coloboma.

The opposite occurred in a case of bilateral spontaneous dislocation of the lens in a man, aged 25. The lens was dislocated downward, and the upper lens border passed almost through the center of the pupil. Here the zonular fibres were torn off except at two places, where they could be seen with the Nernst slit lamp as two narrow bands. At their attachment the lens border formed a hilly prominence. Through the decreased tension of the lens in the portion devoid of zonular fibres the process of apposition became unequal, resulting in a bulging at the places still in connection with the suspensory ligament, which would have corresponded to the radius of the normally developed lens. This observation finds an analogon and corroboration in the experiments of Wessely on the growing eye. The attempted zonulotomy was followed incidentally not by a defect of the zonula but by a cicatricial retraction at the place of the experimental operation. In consequence of the increased traction a prominent process of the lens border was formed.

C. Z.

MATERIA MEDICA AND THERAPEUTICS

"CASTOR OIL AS A MENSTRUUM FOR COCAINE."—MITCHELL, S., Hornell, N. Y. (*Ophth. Record*, May, 1914). The author prescribes cocaine 5% dissolved in castor oil as an emollient in painful diseases of the cornea. G. I. H.

ON THE TREATMENT OF SYMPATHETIC OPHTHALMIA WITH ATOPHAN OR NOVATOPILAN.—GIFFORD, H., Omaha, Neb. (*Ophth. Record*, July, 1914). The author has used this remedy in four cases of this disease, partly as a substitute and partly as an alternative, and the results have been, on the whole, superior to those obtained with salicylate. Forty-five grains a day, and exceptionally 60 grs., is the dose recommended. In many cases he has given 150 grs. a day without soda or inconvenience. G. I. H.

ARE COCAINE SOLUTIONS INJURED BY BOILING?—VIRDEN, JOHN E., New York (*Amer. Jour. of Surg.*, Aug., 1915). The writer points out that there is a general belief that solutions of cocaine salts have their anaesthetic properties injured by boiling. He made numerous experiments with 4 per cent. solutions, boiling some for 3 minutes at a time and repeating this a number of times, and other solutions for much longer periods. As a result of numerous experiments of this sort he found that such solutions remained satisfactorily anaesthetic, that they produced no undesirable effects such as irritation of the cornea or conjunctiva and that the healing of wounds was not interfered with in any way. C. H. M.

THE PRESENT STATUS OF TUBERCULIN THERAPY IN OCULAR TUBERCULOSIS.—WEIDLER, WALTER BAER, New York City (*New York State Jour. of Med.*, Sept., 1915). The writer points out that the tubercle bacilli as the etiology of eye diseases is more generally accepted than it was ten or twenty years ago, and many of the previously obscure lesions of the retina and the choroid are now comparatively simple to diagnose and treat.

He believes that the most essential factors in successful treatment of ocular tuberculosis are, first, a slow and gradual increasing of the dose which may extend over weeks and months; careful preparation of the tuberculins; the sub-cutaneous injection rather than the intramuscular; and the local and general treatment of the ocular lesion with the same means that were employed before tuberculin was added to our therapeutics.

This paper is based upon an experience with 117 examples of tuberculous affections of the conjunctiva, the cornea, the sclera, the iris, and the ciliary body, the retina and the choroid.

He explains the method of production of the various forms of tuberculin, the manner of applying the tuberculin diagnostic tests and the general local and focal reactions. Next a brief summary of tuberculous ocular disease is given together with illustrative case histories of such affections.

His conclusions are: 1. A positive reaction may not be as dependable in suspected ocular lesions of tuberculosis as a positive Wasserman reaction is in suspected ocular lesions of syphilis, but it is at least a strong indication for tuberculin therapy. 2. Tuberculin as a therapeutic measure has an absolutely proven place in the domain of ophthalmology from the results of prominent observers. 3. He believes a great many failures to get results from tuberculin therapy has been due to faulty technique: not continuing the treatment long enough; imperfect and inert tuberculin vaccines; or the use of the wrong tuberculin vaccines. 4. And further that it will be proven as our investigations proceed, that it may be necessary to change our tuberculins when we do not get good results from one kind and use some other form of tuberculin vaccines. 5. The ophthalmologist who is not using tuberculin as a diagnostic agent and as a therapeutic measure is not practicing modern ophthalmology.

C. H. M.

ON THE SPECIFIC OPTOCHIN THERAPY OF PNEUMOCOCCUS INFECTIONS OF THE CORNEA. A CLINICAL, BACTERIOLOGICAL AND EXPERIMENTAL STUDY.—CAVARA, V., Translated by Dr. J. Morgenroth, Berlin (From the eyeclinic of Prof. A. Bietti in the University of Siena. *Klin. Mon. f. Aug.*, 54, p. 601), reports, after a review of literature, his investigations on the action of optochin on the bacteria which are the most frequent causes of kerato-hypopion, on the tissues of the eye, especially the cornea, and the intraocular tension, and his clinical observations on the therapeutic effect of optochin on serpent ulcer and dacryocystitis in 55 cases, the clinical histories of which are given in detail. His conclusions are: Optochin shows in the test tube a decided elective bactericidal action on pneumococcus, superior to any other antiseptic used in ophthalmology, much less on other germs. In cultures the development of the pneumococcus is arrested by optochin in a concentration of 1:500000, of the diplobacillus by 1:10000, staphylococcus and streptococcus by 1:5000 1% solutions, which are generally used.

have an anaesthetic, and if repeated, a slight mydriatic, effect. Optochin is a specific remedy for pneumococcus ulcers of the cornea, which, if superficial, are rapidly and surely cured by hourly instillations of 1% solutions of hydrochloric optochin. Deeper ulcerations require longer treatment. Accompanying iritis is also beneficially influenced by optochin, which can be continued even after perforation of the cornea. Increased intraocular tension is no contraindication to its use, as never a rise of tension is caused by optochin. Dacryocystitis is improved by optochin, in many cases however only temporarily. The remaining scar of the cornea never exceeds the border of the original ulcer. Hence vision is better than after other methods of treatment. The application is easy and simple and may be done by the general practitioner.

C. Z.

MEDICO—LEGAL

THE REGISTRATION OF OPTICIANS.—(*Med. Journ., Australia*, Aug., 1915). A deputation of delegates of the Institute of Ophthalmic Opticians of Queensland waited on the Home Secretary, the Honorable D. Bowman, on July 24, 1915, for the purpose of impressing on him the necessity of introducing legislation to provide for the registration of opticians. The deputation consisted of Mr. Sydney B. J. Sketchley, the president of the Institute, Mr. H. G. McPhail, M. L. A., Mr. L. Young, Mr. A. Luke, Mr. J. W. Case, Mr. G. Hooper, Mr. J. F. Costin, Mr. A. J. Brown, Mr. J. East, and Major J. R. Sankey. The president told the usual story recited in favor of the registration of opticians. In the first place, he called attention to the fact that a bill had been promised to the opticians long ago, that some opposition had been raised to the suggestion, that this opposition stood self-condemned and that it had since died down. It was claimed that a bill was necessary for the protection of the public and in the interests of the opticians. The bill had been introduced, but had failed to secure a passage through the legislative chambers. The speaker claimed that the opticians had as much right to protective legislation as doctors and dentists, but that this had been denied them. Another speaker pointed out that a bill almost identical to the Queensland bill had been introduced into the Tasmanian Parliament and had become law. Mr. Bowman was somewhat guarded in his reply. He promised to bring the matter to the notice of his colleagues, and to give it favorable consideration. On the other hand, he could not guarantee that a bill would be introduced during the current session.

In an annotation published on August 15, 1914, we ventured to suggest to the Institute of Ophthalmic Opticians that before any steps were taken to introduce a bill into Parliament, it would be wise to confer with the Queensland Branch of the British Medical Association, with the view to determine what was in the best interests of the public. This course has not been adopted. Under these circumstances, it is necessary to emphasize a few points in this connection from the point of view of the public.

Opticians and spectacle-makers have a very important function to perform in providing accurately-made glasses for persons with defective vision. But the public must learn that the mechanician is not the person to trust for the determination of defects of so valuable an organ as the eye. It is a common experience of ophthalmic surgeons that patients with conditions like glaucoma foolishly apply to the spectacle-maker for glasses for failing vision and get glasses which are not only unsuitable, but which, for the time, are harmful, because the proper treatment is not instituted. If this can occur in regard to a comparatively frequent disease, how much more certainly will it occur in ocular conditions which are rarer and more difficult to diagnose? Again, a person who has learned his trade in the making of lenses but who has not studied physiology and medicine, cannot possibly recognize when an ocular defect or change is a symptom of a general disease. Patients are often quite unaware of a renal trouble or some cardiac affection when they apply to the optician because the salient symptom is deficient vision. Why should a person who is suffering from a serious heart or kidney disease go for help to a man who makes his living by selling spectacles? The president of the Institute of Ophthalmic Opticians of Queensland may rest assured that the opposition to the registration of opticians is not dead and that any bill legalizing the ophthalmic practice of opticians must be opposed as vigorously as possible.

F. P. M.

MUSCLES

FALSE HETEROPHORIA AND HETEROTROPIA.—MADDOX, ERNEST E., Bournemouth, England (*Ophth. Record*, May, 1915). The author sums up the subject with: (1) That false heterophoria need only be looked for in the presence of aniso-cycloptropia (spontaneous or artificial) combined with a swinging deviation, either of the eye spontaneously or of the image by a prism, or both.

(2) That the amount of this error is a definite quantity, easily

calculated by multiplying the two deviations together and dividing by 57 if all in degrees, or by 100 if all in centrad. For small deviations it is trivial.

(3) That in paralyses of the vertically acting muscles, false elements of the diplopia are always present, the directions of which can read off from my chart.

(4) That the glass rod test evades false heterophoria altogether if care be taken to keep the rods vertical or horizontal. G. I. H.

DIAGNOSIS OF HETEROPHORIA FROM A PORTRAIT.—MITCHELL, S., Hornell, N. Y. (*Ophth. Record*, May, 1914). The author has examined all the portraits of Abraham Lincoln that he could find and discovered that the eyes in all of them presented the same picture of left hyperphoria, and concludes that the fault must have existed in the eyes of the great man, and not made so to appear through the fault of any artist. It is fair to presume that the six or eight degrees of left hyperphoria may have been caused by an uncorrected refractive error and the use of the eye. G. I. H.

OCULAR ROTATIONS.—VALK, FRANCIS, New York, N. Y. (*Ophth. Record*, June, 1914.) The author is of the opinion that in heterophoria, the indications of the Tropometer will give success in all operations for convergent or divergent squint, and it seems to him that the investigations of Lauder, Reber and others must prove the usefulness of this invaluable instrument, the Tropometer.

He affirms that the Maddox Rod test is purely subjective, and is useless with children, but that the findings of the Tropometer are purely objective in both adults and children, and the preference for an objective examination in all ocular conditions goes without saying or argument. It does demonstrate weakness or strength, but not of convergence or divergence; and it is of very practical value in indicating the muscles primarily affected and the operation to be performed. G. I. H.

CONTRIBUTIONS TO THE KNOWLEDGE OF NYSTAGMUS OF MINERS. I. PREDISPOSITION.—OHM, J., Bottrop. (*Arch. f. Ophth.*, 89, p. 505). This elaborate essay is the result of O's investigations within the last 6 years on a large number of coal miners, of whom 747 had nystagmus. The largest proportion of miners remains free from nystagmus even after working for decades of years in the mines. Others are affected easily, the shortest time of incubation being $2\frac{3}{4}$ years. About one-half of all suffering from nystagmus

acquires this before the lapse of 15 years of work in the mines. Discontinuance of work for from 1 to 2 years cures the disease in the early cases but after return to work it soon relapses. It is therefore desirable to recognize the persons inclined to early nystagmus for preventing them from taking up work in the mines. Only a careful physical examination and critical investigation can clear this.

O. considered the following points, arranged in tables: Nationality, general condition, height of the body, alcoholism, condition of the eyes, as external and intraocular diseases, accidents, visual acuity, refraction, accommodation, light sense, influence of alcohol on the light sense. O. found the light sense in nystagmus in general poor. His statistics show under the causes of nystagmus decreased light sense, but not proportional to the gravity, direction and number of oscillations.

Then defects of motility and the binocular visual act were examined and with the other points compared with those found in miners without nystagmus. From this comparison O. found that the etiology of nystagmus cannot be attributed exclusively to a definite physical defect, and surmised that the predisposition to nystagmus is due to a combination of bodily deficiencies, and to another still unknown factor, which he calls X. The formula of predisposition $=V$ consists of light sense $=L$, alcoholism $=A$, squint deviation $=S$, height of body $=G$, and the unknown quantity $=X$. It is $V = \frac{A, S, G, X}{L}$.

C. Z.

MYOPIA

CAN BY PROPER MEANS MYOPIA BE ARRESTED AND THE DEGENERATIVE CHANGES PREVENTED? — SIDLER-HUGUENIN, Zürich (*Arch. f. Aug.*, 79, p. 117), reached from his investigations on 150 cases of high anisometropia, 4,000 myopic eyes of different degrees, 150 highly myopics, 62 patients with zonular cataract, 50 eyes operated on by phakolysis observed for 16 years, and on 134 cases of fully corrected myopia, the same conclusions as Steiger from his embryologic considerations, viz: That the degree of myopia is not determined by external factors but only by the inherited proton of the germ. After having critically scrutinized all means, of which so far a good influence has been expected, S. concedes that they cannot prevent the progress of myopia and its deleterious sequels. The old views must be discarded, that limitation of near

work, ocular dietetics, selection of occupation, correction by glasses, have a favorable influence upon myopia, and we must understand that myopia is an inherited evil, against which natural selection over thousands of years, but not our poor remedies, can accomplish anything. Since opacities of the vitreous and changes of the fundus in high myopia must be considered as pathological or degenerative conditions, also in the future such eyes must be guarded, although S. has not become convinced from his large material, that much can be achieved by it. The practical conclusions are, that the selection of occupation is not to be taken so seriously. Educators, teachers and parents must be informed that not school and homework, resp. near work, poor position of the body, school benches, or illumination, etc., promote the progression of myopia, but that myopia is in most cases inherited and cannot, or very little, be corrected by external factors. Therefore physically and psychically normal children on account of their myopia need not be dispensed from certain lessons which were supposed to strain the eyes. However nervous, feeble, or overtaxed children must be dispensed from facultative branches, not on account of myopia but in the interest of strengthening the body. S. has seen no ill effect from full correction, but it need not be insisted upon with the idea that it arrested the progression of myopia, if it causes distress. The ordination of glasses ought to be governed by the requirements and the subjective feelings of the individual patients. S.'s Roentgen skiagraphs of the orbits showed that there are no definite mutual relations between volumen of the orbit and refraction of the eye, doing away with Stilling's doctrine. C. Z.

OPERATIONS

A SUCCESSFUL METHOD FOR THE REMOVAL OF A FULLY DISLOCATED (LOST) LENS, HERETOFORE CONSIDERED AND REFERRED TO BY AUTHORITIES AS "IMPOSSIBLE OF EXTRACTION," TOGETHER WITH FIVE OTHER CASES.—PAINE, HOWARD S., Glen Falls, N. Y., (*Ann. Ophth.*, July, 1915). This paper describes one case with a lens, an infantile cataract, fully luxated into the anterior chamber, two cases of dislocated—hinged lenses of traumatic origin, and three spontaneous dislocations, one being absolutely free and "lost" in the vitreous, and is intended especially to show how to successfully remove lenses fully dislocated and floating about or lying in the bottom of the vitreous chamber, the kind that up to the present have been called "impossible of extraction."

A summary of the advice given by various authorities when dealing with dislocated lenses is given. The writer believes that the failure to operate has been due to the fact that the contents of the globe are invisible to the operator, and that the eyes are diseased eyes and that the speculum as ordinarily employed causes the contents of the eyeball to bulge forward and favors their escape.

He describes the operation in five examples in which the eyes were saved and attributes his good results to having the eye speculum gently lifted thus avoiding pressure and to good illumination of the interior of the eye during the entire operation; he made an incision and broad iridectomy, could see the lens, and by slipping a Knapp's loop behind it, could lift it out. The first patient had, 18 months after operation, V. 20/20 and could read diamond type. His second operation was also successful. The third one presented a lens fully dislocated into the vitreous; after section and iridectomy, it was seized with a Steven's hook, raised up to the incision and a Smith spatula passed behind it, after which it was slid out by pressure applied from the outside of the cornea—pushed, *not* lifted out; the result was excellent. The fourth and fifth cases were equally successful.

C. H. M.

TARSORRHAPHY.—ELSCHNIG, A., Prag. (*Zeit. f. Aug.*, 33, p. 280). devised the following operation, in local anesthesia with 2% cocaine or novokain solution and adrenalin: After insertion of Jaeger's plate the intermarginal section is made in the extent of the intended shortening, and the medial end of the conjunctival plate incised for from 3 to 4 mm. vertically to the lid border. In this depth both plates of the lid are separated in the extent of the intermarginal section up to and under the external canthus. The inner portion of the external plate, with preservation of the lashes, and the internal plate, in its whole width, are pared. In the same fashion the upper lid is split into 2 plates. Then the free corner of the inner plate of the upper lid is grasped with a toothed forceps and by a cut, first parallel to the lid border, then turning downward in form of an arc as far as and under the external canthus, the triangular piece of the inner lid plate, thus circumscribed, is entirely removed. Hence a triangular defect of the inner plate of the upper lid results whose apex lies under the external canthus, and whose the small base is formed by the lateral edge of the intact inner plate. After paring the external plate up to the canthus, in the same way as that of the lower lid, the inner plate of the lower lid is drawn into the defect by a double armed loop; 2 mm. from

the pared margin of the mobilized inner plate of the lower lid both needles are successively inserted from the conjunctival surface and from behind pushed out about 4 mm. above the row of the lashes of the upper lid. The thread is at first slightly drawn and, after uniting both external plates by from 2 to 3 sutures, tied over a piece of gauze. The operation meets all demands of cosmetics.

C. Z.

AN OPERATION FOR THE PREVENTION OF SYMBLEPHARON.—STARR, ELMER G., Buffalo, N. Y. (*Ophth. Record*, June, 1915). The operation consists in completely dividing the lower eyelid (when this is the one affected) from its margin well down to the lowest portion of the cul-de-sac and stitching the two flaps or halves thus made, one to the side of the nose, the other to the cheek, where they are covered with some bland sterile dressing until new mucous membrane has formed over the injured surfaces, when the cut edges of the lid are "freshened" and stitched together in their normal position. In other words, the injured eyelid is everted and held in this position, thus keeping the injured surfaces separated until healed.

G. I. H.

THE USE OF THE SNARE AS THE FINAL STEP IN THE ENUCLEATION OF THE EYE.—WRIGHT, HAL R., Columbus, Ohio (*Ophth. Record*, September, 1914). Incise the conjunctiva as near the cornea as possible, the dividing all muscles as close to the sclera as possible, taking care not to button-hole the sclera; now pass the hook entirely around the globe to ascertain if all but the posterior attachments are free, then drop the loop of suitable size to pass over the globe, grasp the eye with the fixation forceps and work the snare wire down over the globe, then slowly close the snare until the ball is free. A strong snare that can be operated with one hand is the instrument of preference.

G. I. H.

EXTERNAL CANTHOTOMY.—LAMB, ROBERT SCOTT, Washington, D. C. (*Ophth. Record*, September, 1914). This is a plea for the frequent and more general use of this well-known operation. The author has never found corneal ulcer which has not been benefited by it.

G. I. H.

ON ANESTHESIA BY CONDUCT THROUGH POSTERIOR ORBITAL INJECTION.—A NEW METHOD FOR BROADENING THE INDICATION OF LOCAL ANESTHESIA IN ENUCLEATIONS AND EXENTERATIONS

OF THE EYEBALL AND THE ORBIT.—SEIDEL, E. (From the eyeclinic of Prof. E. Wagenmann in the University of Heidelberg. *Arch. f. Ophth.*, 89, p. 414), recapitulates his method of local anesthesia for enucleation and exenteration of the eyeball, described in *Klin. Mon. f. Aug.*, 49, 1911, p. 329, which proved very successful in 200 operations. As this method is contraindicated in infections of the conjunctival sac and inflammations of the peribulbar tissues, tumors of the entrance of the orbit, injuries with large perforation of the globe and very staphylomatous eyes, S. devised for such cases a new method of anesthesia of the first and second branches of the 5th nerve by the posterior orbital injection of 4% novocain-adrenalin solution. The maximal dosis of adrenalin is 6 drops. The essential point is the laying of a depot of a small quantity of a highly concentrated solution near the apex of the orbit from under the zygomatic bone through the infraorbital fissure. The anesthesia is indirect through conduct, as the nerves and the ciliary ganglion are not directly injected but are gradually reached by the diffusion of the novocain into the surroundings.

After disinfection of the skin with tincture of iodine, the needle enters one finger wide below the anterior portion of the inferior margin of the zygomatic bone, and the skin is superficially infiltrated. Then 6 cm. are injected at the posterior surface of the supramaxillary bone into the pterygo-palatine fossa. Five minutes after these preparatory injections the posterior orbital injection is made with a hollow needle, 8 cm. long, not quite 1 mm. thick, provided with handle and mandrin, along the anterior margin of the masseter muscle toward a point on the top of the head, marked by placing the index finger on it. This point lies thumb wide toward the other side from the intersection of coronary and sagittal sutures, and is found as follows: The head of the patient is turned backwards so that the plane through both horizontal branches of the lower jaw is exactly horizontal. The border of a towel is placed vertically over the head from the anterior margin of one mastoid process immediately behind the external meatus to the other. From the point of intersection of the crest of the nose, produced backwards, and this meridional plane, thumbwide to the other side lies the desired point. After the needle has been introduced for about 4.5 cm. the fibrous closure of the inferior orbital fissure is felt as resistance and perforated. The mandrin is removed, the syringe (containing 2 cm.) inserted into the needle, and 1 cm. injected, which causes slight exophthalmus, and after pushing the

needle about 1 cm. deeper, another cm. The needle is pulled back 2 cm. and simultaneously 4 cm. of the solution injected as retro-bulbar depot, i. e., from 4 to 6 cm. altogether. After 20 minutes the anesthesia is complete. For illustration 4 cases are reported.

C. Z.

BONE IMPLANTATION.—OEHLCKER (*Arzt. Verein* in Hamburg, May 4, 1915). The author believes in filling out the cavity left after enucleation or evisceration in order that there may be a better fitting prosthesis, but objects to the use of fat on the grounds of excessive shrinkage. He implants bone and prefers to use the head of one of the small bones of the hand or foot. Two cases with successful implants were shown.

H. S. G.

OPTICS

VERTEX-REFRACTION IN ITS TRUE ASPECT.—PRENTICE, CHAS. F., New York, N. Y. (*Ophth. Record*, June, 1915). The author states in conclusion that, from a strictly practical point of view the vertex-system is a reliable monitor to insure the righteous performance of convex lenses, especially those which are stronger than 7 dioptries, and a subtle guide to the correct substitution of a deeply curved lens, either spheric or toric, for any lens or combination of lenses that may be mounted in the trial frame at a definite distance from the eye. More can not be consistently claimed for it. While it is true that the vertex-system of measurement and the method of neutralization are equally inefficient with respect to disclosing the true refracting power of a strong convex lens, yet the present practice of neutralization should be perpetuated as an eminently convenient means of verifying the fact that: When two contra-generic lenses, of any power and of minimum thickness, effectually neutralize each other, they are of the same vertex-refraction.

G. I. H.

SOME HISTORICAL DATA CONCERNING GLASSES.—HILL, EMORY, Chicago, Ill. (*Ophth. Record*, October, 1914). To summarize, we may say that the inventor of glasses is unknown; the nations of antiquity probably knew nothing of these instruments; the ancient classics are devoid of mention of glasses. Alhazen seems to have made no practical use of his knowledge of optics. Near the end of the thirteenth century convex spherical lenses came into use in China and in Europe. It is probable that neither obtained their

knowledge from the other. European evidence favors the view that Roger Bacon made glasses independently of Chinese influence or discovered the invention of some learned predecessor.

G. I. H.

ACCOMMODATION SPECTACLES.—LAUBER, H., Wien (*Arch. f. Ophth.*, 89, p. 401), describes his accommodation spectacles which resemble in shape the telescopic spectacles. Each eye of the spectacles consists of 2 lenses, mounted at a small distance from each other in such fashion that the anterior lens can be removed from the posterior, stable, lens, whereby the refraction of the whole optical system is increased. The refraction can be changed by 4 dioptries, which suffices for the practical use of a person deprived of accommodation. He thus can accommodate for any distance from infinity to 25 cm. The field of fixation is limited to 24° . The spectacles weigh 43 grammes. They are adjusted by one screw, and the mechanism assures simultaneous correct convergence, imitating the normal process.

C. Z.

TO THE THEORY OF THE ACCOMMODATION SPECTACLES OF LAUBER.—VON ROHR, M., Jena (*Arch. f. Ophth.*, 89, p. 408), propounds the mathematical theory of the accommodation spectacles of Lauber, which must be read in the original.

C. Z.

WIDE-APERTURE LENSES—PUNKTALS AND KATRALS.—PRENTICE, CHARLES F., New York, N. Y. (*Ophth. Record*, July, 1915). The Punktal Lens, which is numbered in vertex-refraction and designed to eliminate the astigmatism due to oblique light-incidence and to render available a field of view of about 60° , in order that objects viewed through the extreme marginal zone of the lens may be seen as distinctly as through its center. When the power of the convex Punktal Lens exceeds 7 D it is called a Katral Lens, in which the base curve is made aspheric, in order to correct the aberration for the full aperture of a meniscus of high power.

Prentice is of the opinion that the Punktal Lens which is unquestionably the most scientifically devised ophthalmic lens as yet produced, even though in some powers it may be objectionably thick. The cost of a pair of Katrals is said to be about \$75.00.

G. I. H.

OPTIC NERVE

PSEUDO-OPTIC NEURITIS.—CALHOUN, PHINIZY, Atlanta, Ga. (*Ophth. Record*, May, 1914). The author reports a case of a woman age 43. The margins of the disc were blurred and obliterated by a slight swelling. The vessels were normal in size and placement except the temporal veins of the right eye which were slightly full, and as the vessels approached the disc, they were lost or covered in the slight swelling and striations of retinal tissue.

G. I. H.

AN INTERESTING CASE OF ACUTE RETRO-BULBAR NEURITIS.—WILLIAMS, CARL, Philadelphia, Pa. (*Ophth. Record*, August, 1915). Aside from interest in this rather peculiar form of ocular disease, this case has been most interesting because baffling in the attempt to find the causative factor. "Our examinations leave us the doubtful Wassermanns, the metabolic and possibly the menstrual theories: also, I think, we must consider a possible nervous origin. It is possible the persistent and increasing peripheral sensations are the forerunners of some more serious disturbance of central origin."

G. I. H.

HOLE IN THE DISC ASSOCIATED WITH VIBRATION OF AN OVERLYING MEMBRANE.—HOLLOWAY, T. B., Philadelphia, Pa. (*Ophth. Record*, May, 1915). Male, age 19. The periphery of the lesion corresponded to the margin of the disc and in size it was about one-third the diameter of the papilla. Just within the margin of the pigmented area there was a delicate white oval. The lesion was greenish black in color, appearing as though the tissues had been saturated with a soluble stain rather than being the seat of the ordinary pigment deposit. It conveyed the impression of an excavation, as one could distinguish a sloping of the margins to the position of the white rim. Opinions vary as to the etiology of this condition.

G. I. H.

DOUBLE PAPILLO-EDEMA—OPTIC NEURITIS.—SATTLER, ROBERT, Cincinnati, Ohio (*Journ. Ophth. and Oto-Laryn.*, August, 1915). The purpose of this paper mainly emphasizes the necessity of an early search and discovery of this ocular symptom, and in every probable case to advise and practice at the earliest opportune time, surgical treatment for the primary intra-cranial lesion, as this alone offers the only hope to stay or relieve impending sudden or

lingering blindness for a shorter or longer time period; and in those cases in which the removal of the tumor is possible and justifiable, to prolong or restore both a proportional share of health and sight.

G. I. H.

ON ACUTE RETROBULBAR NEURITIS LOCALIZED IN THE CHIASM.
—CLINICAL AND ANATOMO-PATHOLOGICAL INVESTIGATIONS.—
RÖNNE, HENNING, Copenhagen (*Klin. Mon. f. Aug.*, 55, p. 68), reports 7 cases, with a collection of cases from literature. The beginning of the disease, the subjective symptoms, and course, are essentially identic with the severe forms of retrobulbar neuritis. The visual field is characterized most frequently by simultaneous hemianopic (often temporal hemianopic) defects and central scotomas. The defect often shows a peculiar migratory type, which is not found in any other form of the disease. The affection frequently accompanies myelitis and multiple sclerosis, and is a retrobulbar neuritis, without regard to the often present optic neuritis or choked disc. The ophthalmoscopically visible edema of the disc is secondary to the affection of the more proximal portions of the visual path. It is localized in the stem of the optic nerve and especially in the chiasm, which influences the visual field and the course. Corresponding retrobulbar neuritis with predominant localization in the chiasm is also found without concomitant spinal affections.

C. Z.

TWO RARE CHANGES AT THE OPTIC DISC.—(EPIPAPILLARY OPAQUE NERVE FIBRES AND PIGMENTATION OF THE DISC.—
PÁLICH-SZÁNTÓ, OLGA (From the eyeclinic of Prof. Ernst von Grosz in the University of Budapest (*Klin. Mon. f. Aug.*, 55, p. 149). The optic disc of the right eye of a soldier, who never could see well with this eye, was larger than normal, projected 2 D, and had a bright yellow color. The vessels were normal. The prominence was caused by a proliferation of tissue of decidedly fibrous structure. The left disc showed similar changes, but not as marked. P. explains the condition by an abnormal longitudinal growth of medullated nerve fibres in front of the vascular funnel and covering the vessels of the disc. In connection with this case she gives a very good review on the typical and very rare variable anomalies of the optic disc.

Case 2. A soldier, aged 26, with normal vision, showed in his left eye a pigmentation of the nasal half of the optic disc. The

pigment consisted of fine granules, lay chiefly on the surface, but also was noticeable in the deeper portions.

After discussing the different explanations of pigmentation of the disc, the author considers the following 3 as the most probable: 1. Embryonic scattering of germs producing an isolated group of pigmented cells at places where they do not occur normally (Seefelder and Ogawa). 2. From embryologic investigations Pick found that in the human embryo in 7th week or perhaps earlier powerful tracts of pigment pass from the pigment layer of the eye into the optic stalk. Hence it may be possible that these pigment tracts occasionally persist and cause pigmentation of the disc. 3. According to Berger the inner strata of the lamina cribrosa originate from the chorioid. Their peripheral portions always contain some pigment cells. Berger ascribes the pigmentation of the disc to the abnormal hypertrophy of these cells.

Colored plates illustrate the ophthalmoscopic conditions of both cases.

C. Z.

PATHOLOGY.

A NEW METHOD OF PREPARING AN EYE FOR MICROSCOPIC SECTIONS.—WRIGHT, HAL R., Columbus, Ohio (*Ophth. Record*, May, 1914). The author gives a description of the fixation apparatus by which intra-ocular pressure is maintained and the tissues fixed in their normal positions, thereby preventing detachment of the retina and shriveling and wrinkling of the cornea. G. I. H.

CLINICS, ANATOMY AND MECHANICS OF DEVELOPMENT OF THE RIBBONSHAPED OPACITIES IN THE HYDROPHTHALMIC EYE.—STÄHLI, J.) From the eyeclinic of Prof. O. Haab in the University of Zürich (*Arch. f. Aug.*, 79, p. 141), reports his clinical observations on 40 eyes and his anatomical examinations of 8 human and a number of hydrophthalmic eyeballs of rabbits. The ribbon-shaped opacities of Haab are due to ruptures of Descemet's membrane and occur in more than 3/4 of all hydrophthalmic eyes. Hence they are a most valuable diagnostic sign of infantile glaucoma in later life, and the central prepupillary opacities are a very important, so far neglected, element in the impairment of central vision, as S. found to 1/2 or 1/3. These opacities were also found after ruptures of Descemet's membrane in newborn children delivered with forceps, and megalocornea. S. describes the methods of examination with Nernst lamp, Hartnack's globular loupe and Berger's binocular loupe, the location, direction, shape,

and finer details of the opacities, their anatomy with numerous illustrations, and his theory of the mechanism of their development, with historical remarks. C. Z.

ANAPHYLAXIS EXPERIMENTS WITH OLD TUBERCULIN (KOCH) IN DIFFERENT APPLICATIONS, AND REMARKS ON SO-CALLED SYMPATHETIC SPECIFIC SENSIBILIZATION.—VON SZILY, A., and LUCIANI (From the eyeclinic of Prof. Th. Axenfeld in the University of Freiburg. *Klin. Mon. f. Aug.*, 55, p. 34), report on their experiments on rabbits, with the following conclusions: Neither through intralaminar corneal injections nor through inoculations of the anterior chamber can old tuberculin be rendered more effectful for the second, untouched, eye. The limit for the inflammatory titer is the same for normal and previously injected animals. The sensitization from eye to eye is of as little avail as the previous subcutaneous treatment with old tuberculin. The latter rather seems to show a minimal effect. Hence it is not permissible to infer from the tuberculin experiments a proof for a special elective sympathetic sensitization from eye to eye. The possibility of an "inflammatory specific sensitization of symmetrical organs" is so far not proven. Hence all conclusions reached by Dold and Rados from their experiments with tuberculin and croton oil for the sympathetic inflammations of symmetrical organs, especially sympathetic ophthalmia, are "air built." C. Z.

ANAPHYLAXIS IN OPHTHALMOLOGY.—RADOS, A. (From the eyeclinic of Prof. E. von Grósz with University of Budapest. *Arch. f. Ophth.*, 89, p. 562), criticizes in connection with his own and Dold's investigations the recent monograph of von Szily and Arisawa on anaphylaxis in ophthalmology. C. Z.

ANAPHYLAXIS AND EYE.—ZADE, M. (From the hygienic institute of Prof. Neisser at Frankfurt a. M. *Arch. f. Ophth.*, 89, p. 459), reports his anaphylactic experiments on the cornea of guinea pigs, consisting in intracorneal injections of horse serum and albumen of chicken eggs as antigens. He found that guinea pigs can by intracorneal sensitization be made anaphylactic for intraperitoneal reinjection. One intracorneal injection of horse serum in guinea pigs is followed by more or less severe keratitis, lasting 4 days at the highest. Twice late keratitis occurred. After 12 out of 35 injections the eyes were quiet on the next day. Egg albumen is tolerated without reaction. After intracorneal sensitization

no definite local anaphylactic effect was obtained by local reinjection. Subcutaneous sensibilization and ocular reinjection: with egg albumen no local reaction with pure horse serum out of 4 cases in 2 late keratitis, with mixture of toxin and antitoxin in 3 out of 4 cases late keratitis. The late keratitis is a severe diffuse deep keratitis with vascularization and may almost entirely clear up in a few weeks. It is perhaps of anaphylactic nature. Digestion of active serum of the guinea pig with starch produces a strong poison for the cornea of the rabbit (artificial anaphylatoxin). C. Z.

ON INTRAOCULAR ANAPHYLAXIS AFTER THE APPLICATION OF VITREOUS OF CATTLE AND SHEEP AS ANTIGENS. — TRUBIN, A. (From the eyeclinic of Prof. P. Roemer in the University of Greifswald. *Arch. f. Ophth.*, 89, p. 221). reports his experiments on rabbits. From 18 to 70 ccm. of the vitreous were injected into the auricular vein. After from 20 to 55 days 0.2 ccm. of the antigen was injected into the lamellae of the cornea, in other experiments 0.25 ccm. into the anterior chamber, and in a third group 0.25 ccm. into the vitreous, followed by pathological changes which must be considered as anaphylactic symptoms, since they did not occur in the control animals. These changes were mild after reinjection into the cornea, marked but transient after reinjection into the anterior chamber, most intense and lasted longest after reinjection into the vitreous. Reinjection into the vitreous of a previously treated animal produced degenerative alterations in the retina, pigment epithelium, and chorioid, followed by atrophy of the tissues. Intraocular anaphylaxis is distinguished from endophthalmitis from infection by not as marked inflammatory phenomena and the lack of purulent exudation with subsequent cicatrization and shrinking of the eyeball. The changes of the retina, pigment epithelium, and chorioid are primary. On account of the participation of the retina in the process or at least the independence of the retina from the affection of the chorioid there is no analogy with sympathetic ophthalmitis. Therefore T.'s findings were not sufficient for supporting the theory of Elschnig. Another difference between the intraocular anaphylaxy and the typical picture of sympathetic ophthalmia is the lacking plastic uveitis.

C. Z.

PHYSIOLOGY

LIGHT.—GOETZ, H. E., Knoxville, Tenn. (*Ophth. Record*, May, 1914.) Ultra-violet rays are harmful to the human eye in the main, because of their absorption by the lens, and in which it is

believed they produce cataract and premature presbyopia. They undoubtedly cause external injuries to the eyes, accompanied by deep-seated ocular pains, which tend to persist. All artificial light is far more harmful to the eyes than daylight since they all contain an abundance of invisible energy and produce power burns and a train of symptoms usually seen in asthenopia. G. I. H.

THE PROTECTION OF THE NORMAL CRYSTALLINE LENS AGAINST THE HARMFUL EFFECT OF ULTRA-VIOLET LIGHT.—BURGE, W. E. and NEIL, A. J. (*Arch. Ophthalm.*, Sept., 1915, XLIV, 498), describes a series of experiments carried out to determine whether opacity of the lens or cataract could be produced in excised pig and ox lenses by radiant energy. The authors' method of conducting the experiments is described and they give the following conclusions:

1. Cataract or opacity of excised pig and ox lenses cannot be produced by means of radiant energy from the infra-red, the visible, or the ultra-violet regions of the spectrum, under conditions much more extreme than any to which the human eye is ever subjected, provided the heat effect be excluded.

2. The lens protein can be so modified by weak solutions of the salts that are found in cataractous lenses and by dextrose that ultra-violet radiation can produce coagulation and hence opacity of the lens or cataract.

3. The same substances which modify the lens protein so that ultra-violet radiation can produce opacity also decrease the fluorescence of the lens.

4. Fluorescence bacteria are more resistant to the action of ultra-violet radiation than non-fluorescing.

5. A provisional hypothesis is advanced that the great resistance exhibited by the lens and by fluorescing bacteria to the action of ultra-violet may be due to this power of fluorescing. The assumption is that the lens and fluorescing bacteria by converting the absorbed short waves into longer waves get rid of more or less of the energy which otherwise would have been spent in coagulating their protein.

W. R. M.

THE RELATED FIGURATIVE CHIASMAL AND MEAN CYCLOPEAN IMAGES.—PRENTICE, CHARLES F., New York (*Ophth. Record*, July, 1914). The author affirms that no matter what misconstruction may have been placed by others upon the writer's association of the optic-nerve fibrils with a strictly figurative chiasmal image,

the fact remains that, he has proven what the hitherto unknown dimensional proportions and distances between the mentally conceived dual images in binocular vision actually are when faulty deviations between the visual axes exist. G. I. H.

ON THE PARENCHYMATOUS LYMPH CURRENT IN THE OPTIC NERVE AND THE RETINA.—BEHR, CARL (*From the eye clinic of Prof. L. Heine in the University of Kiel. Arch. f. Ophth.*, 89, p. 265), reports after a review of the extant researches his investigations on a large material of human optic nerves soon after death or on enucleated eyes, more than 50, and on living dogs. According to the methods of Schwalbe, Key and Retzius, and others, Prussian blue mixed with equal parts of glycerin was used for injection, in some cases a 10% solution of formalin. The method is described in detail.

The results were the following: Aside of the osmotic, respectively the still unknown but certainly existing vital, functions of the glious limitant membranes with regard to the exchange of fluids between the ectodermal nervous-glious and the mesodermal septal tissues two independent lacunar lymph systems exist in the optic nerve and retina: the parenchymatous nervous-glious and the circumvascular systems. The glious fibers subserve the parenchymatous lymph current. Therefore those parts, in which these fibers are accumulated in greater quantities, viz. the subpial (peripheral glia mantle) and subseptal, are chiefly filled by injections into the optic nerve. The fluid moves along, not in, the fibers of the glia to the interior of the nerve bundles, which thus are pervaded by a narrow net of parenchymatous clefts. These extend into the layer of nerve fibers of the retina, have a more radial course, and are interwoven.

In the retina are also two more lacunar systems communicating with the parenchymatous lymph clefts of the optic nerve: a space between pigment epithelium and the terminals of the rods and cones and a second space between limitans interna and the layer of nerve fibers. There is no connection with the chorioid or vitreous. The small celled infiltration encountered in some cases of abscess of the vitreous or inflammations of the anterior segment of the globe around the central vessels is due to osmosis and is of no account for the physiological lymph current in the individual parts. The lacunar systems of the intraorbital portion of the optic nerve are completely separated from the intervaginal space by the pial covering. The fluid freely circulating in the tissue of

the retina flows through the disc into the optic nerve, mixes here with the tissue fluid from the optic nerve and travels in it intrapially in a central direction. The circumvascular lymph spaces of the central vessels shortly before their exit from the nerve have a wide communication with the lacunar system of the nerve toward the center. A part of the fluid circulating in them passes with them into the intervaginal space. Here it spreads exclusively at the subarachnoidal space in the blind end between emergence of vessels and bulbous peripherally, not centrally. In the intervaginal space the subdural and subarachnoidal spaces can be injected isolately. Both have outlets to the adjoining spaces, an epidural space on the one, a subpial on the other side. The current of fluid in the intraorbital part of the nerve runs in the single nerve bundles. In the cranial cavity it flows from the nerve through the pial sheath into the subarachnoidal space of the brain and at the posterior angle of the chiasm directly into the recessus of the third ventricle, which therefore is nothing else but a canal of communication between the lacunar system of the optic nerve, respectively the chiasm and the third ventricle. Through introduction of very small quantities of an emulsion of india ink into the optic nerve of living dogs, near the globe, B. proved that the single particles of india ink were carried centripetally for large distances within the bundles of nerve fibers solely through the vital lymph stream. They neither enter the intervaginal space through the pial sheath, nor within the nerve into the interior of the septal structure. Thus the existence of a centripetal lymph current in the nerve of the living animals has been proven. C. Z.

STUDIES ON THE REGENERATION OF CORNEAL TISSUE AND THE TRUE NATURE OF THE KERATOBLASTS.—HANKE, VICTOR, Wien (*Arch. f. Ophthalm.*, 89, p. 350), reports his experiments and histological investigations on the regeneration of the corneal tissue of rabbits. From these he reached the conclusion that the views of Salzer, Bonefon and Lacoste on the regeneration of the cornea are untenable, that the keratoblasts originate from the mesodermal fixed corneal corpuscles and that also the endothelium of Descemet's membrane participates in the building of the new corneal tissue. H. says that this entirely corresponds with the most recent embryologic researches. C. Z.

HISTOLOGICAL CHANGES IN EXPERIMENTAL CHOKED DISC.—RADOS, ANDREAS, Budapest (*Arch. f. Aug.*, 79, p. 199), produced

in rats by intracranial inoculation of sarcoma brain tumors which grew slowly, so that after from four to 6 weeks symptoms of intracranial pressure were noticeable. The blood supply of the central artery of the rat is furnished by an artery coming from the middle meningeal, which goes to the internal or external ophthalmic artery. The ophthalmoscopic and histological examinations in these inoculated animals showed a remarkable resemblance to the human choked disc: fungiform projection and enlargement of the disc, ampullar distension of the intervaginal space, proliferation and swelling of the arachnoidal cells, edematous, i. e. serous imbibition of the supporting tissue of the disc, and always small hemorrhages. The more intense infiltration with round and spindle cells indicated a later stage. The experiments showed that choked disc develops more rapidly on the inoculated side. The experimental choked disc, produced by intracranial inoculation of virulent tumors similar to the natural conditions, suggests a mechanical etiology. The findings, however, so far did not disclose the finer mechanism of the genesis of choked disc. C. Z.

ON VISIBLE CURRENTS IN THE ANTERIOR CHAMBER.—BERG, F. (*From the eye clinic of Prof. A. Dalen at Stockholm. Klin. Mon. f. Aug.*, 55, p. 61), observed on focal illumination with Nernst lamp and aplanatic lens in cases of iritis and iridocyclitis with slight opacities of the aqueous, a current of the particles, in the posterior portions of the anterior chamber upward, in the anterior portions downward. According to physical laws this is due to the different temperature near the iris and near the cornea. At the warmer iris the fluid is heated and becomes specifically lighter, consequently it rises, while at the colder cornea the fluid by losing heat grows heavier and sinks down. The current always follows gravitation, e. g. if the patient lies on the side, vertically from above downward in the horizontal meridian of the eye. If the eye is covered by the crystal of a watch and the space between both filled with water of the temperature of the body, the current ceases, as now the anterior and posterior walls of the anterior chamber have about the same temperature. The current is most marked in patients after cataract extraction on account of the greater depth of the anterior chamber. Türk had observed the same phenomenon in experiments after subcutaneous injections of fluorescein, under the name of Ehrlich's Line.

B. doubts the correctness of Türk's explanations of the triangular arrangement of precipitates on the posterior surface of the

cornea as consequence of the regular current of the aqueous, which he thinks is at this place minimal or lacking, because also here a constant current exists. He ascribes it to a probable effect of gravitation and centrifugal force. (Fuchs, text book, 12th edition, p. 413, attributes the triangular form to the movements of the eye, by which the precipitates are hurled against the cornea, and compares the process to the results of throwing of gravel through a screen or shaking grain in a sieve. Here the stones or grains always gather in a heap with an apex upward, which contains the smallest particles, while larger ones successively accumulate downward.—Reviewer.)

C. Z.

ON PHOTOGRAPHIC MEASURING OF THE INTEROCULAR AND PUPILLARY DISTANCES IN MOVING THE EYES FROM BELOW UPWARD IN MEDIUM FIXATION.—KUNZ, L., and OHM, J. M. D. (*From the physical laboratory of the gymnasium at Bottrup. Arch. f. Ophth.*, 89, p. 469), describe in detail the apparatus with which they measured the interocular and pupillary distances, while the position of the head, distance of point of fixation, and illumination were constant. The investigations, given in tabular form, showed with regard to the constancy of the points of rotation of the eyes in the orbit during ocular movements, that there are cases in which the guidance of the eyes in spite of the considerable shifting of the soft parts of the orbit during the movements of the eyes from below upward is so ideal as if it occurred in a stable layer around a fixed point. At least no displacement of the points of rotation takes place in horizontal direction. This mathematically exact constancy of the distance between the eyes is the consequence of the binocular fusion of the retinal images, and may persist if this is eliminated for a short time by covering one eye. Therefore this method would, if the measurements of the interocular distances in different positions of fixation were the same, objectively and absolutely prove the existence of the binocular visual act. In other cases with binocular visual act the guidance of the eyes is less exact. The interocular distance is smallest in downward fixation, waxes in the upward movement to the horizontal and in further elevation still increases or decreases. The law is also valid, if the binocular visual act is spontaneously or artificially suspended, but then the differences generally are much greater than in binocular fixation. The differences of the pupils in different fixation are slight, but often marked. A constant relation seems to exist between fixation and size of the pupils. At least in some cases the

changes of the size of the pupils go rather parallel with those of the interocular distance. With regard to the behavior of the ocular muscles in miners, cases of ideal muscular balance and of increasing divergence upward occur. C. Z.

REFRACTION AND ACCOMMODATION

ERRORS OF REFRACTION AND THEIR AVERAGE FREQUENCY.—DURAND, A. C., Ithaca, N. Y. (*Ophth. Record*, September, 1915). The author states the differences would seem to be due to lack of uniformity in methods of refraction, or differences of opinion in regard to the objects for which glasses are fitted. Unless the various methods produce essentially the same results some one method, scientifically applied, must become the standard or else the reputation of the profession will continue to suffer as it has in the past. At present the subjective test at the trial case is apparently the court of last appeal, and hence it should give essentially the same result in a given case in the hands of any number of refractionists. In a given case there is only one true correction for the static error present, and, ideally, all methods and all operators should be able to find that correction without variation. The day is past when an eye with half a diopter of error can be considered emmetropic, for in the hands of a careful refractionist a quarter and even an eighth of a diopter is often potent for good or ill. G. I. H.

THE ADVANTAGE OF A SMALL AMOUNT OF ASTIGMATISM, WITH THE RULE.—WIPPER, OTTO, Chicago, Ill. (*Ophth. Record*, June, 1915). The author believes that when the meridian of greatest power is not at 90, the slightest amount of astigmatism is apt to produce symptoms and must be fully corrected. But thinks that we should deduct at least .25 diopter in case of astigmatism with the rule to insure comfortable vision. G. I. H.

A PLEA FOR THE MORE UNIFORM REPORTING OF VISUAL ACUITY.—GRADLE, HARRY S., Chicago, Ill. (*Ophth. Record*, June, 1915). The visual acuity is frequently reported in fractions with varying numerators and denominators. Thus, a report, based on a working distance of 15 feet is apt to be puzzling to another individual accustomed to a 40-foot working distance. 15/15 is intelligible enough and is readily translated to 40/40. The author presents two tables. In table I the visual acuity is given in red

figures (on the left) in decimal system. The corresponding figures in the subsequent columns are the records of visual acuity at different distances and the size that the letters should be (in centimeters). By means of this chart the test type may be measured to test the accuracy, and the equivalent value in decimal notation seen at a glance. Chart II is similar to Chart I, but more condensed.

G. I. H.

APPARENT ACCOMMODATION IN APHAKIA.—COLLINS, E. TREACHOR, London, Eng. (*Report of 1915 annual meeting of the Ophth. Soc. United Kingdom, Med. Press, May 12, 1915*). The case described was that of a boy who had lamellar cataracts removed when 7 years old by repeated discission. When 14 he was able to use one pair of glasses for both distance and near; with plus 13.00 his vision was right 6/6 and left 6/9, and with the same glasses he read J. 1 fluently. Any alteration in curvature of the cornea while he adapted his eye for the near point was excluded by examination with the ophthalmometer and by the use of Batten's eye bath. Any lengthening of the antero-posterior axis of the globe was watched for by ophthalmoscopic examination. He could see just the same when the eyelids were held away from contact with the globe. When the pupils were semi-dilated with cocaine, he could still read J. 1 with plus 13 in ordinary daylight with the right eye, but only J. 2 with the left. When the pupils were fully dilated with atropine he could only read J. 10 with plus 13 in ordinary daylight; but in the dark room with a strong light concentrated on the test-type he still read J. 1, better with the right eye than with the left. When examined with the pupils well dilated, it was seen that in the right eye there was a membrane with a sharply defined, central, circular aperture in it, 3.5 mm. in diameter. In the left eye the aperture was larger and more oval in shape; the membrane in it, moreover, did not occupy the entire pupillary area, a space being left at the circumference between it and the pupillary margin. Both pupils were regular, free from any adhesions, and acted very briskly to light. The author considered that the evidence he had collected in connection with this case went to show that there was not any true accommodation; that the boy's power of seeing clearly at different distances was due to the cutting off of circles of diffusion, partly by the contraction of the pupils, but mainly by the small central openings in the membranes. He quoted several other cases which had been recorded, in which apparent accommodation was present after the

removal of the lens, and advocated trying to adapt the *technique* in operations for soft cataract so as to produce a condition similar to that in the case here described.

C. H. M.

FRAGMENTS ON ERRORS OF REFRACTION AND CORRELATIVE ANOMALIES.—STREIFF, J., Genua-Zürich (*Klin. Mon. f. Aug.*, 55, p. 1), gives in systematic arrangement a collection of cases illustrating ocular anomalies associated with astigmatism: Congenital opacities of the cornea, congenital flatness of the cornea in the same families (Rübel), congenital megalocornea (Horner), keratoconus, remnants of the pupillary membrane, anomalies of the lens, of the iris, as albinism, hetero-hyperchromia (partial), irregular shape of the pupil, congenital ectropium of the uvea, defects of the iris, lower excavation of the iris, anomalies of the chorioid, optic nerve, central vessels and retina, as coloboma of the disc, prepapillary membrane, abnormal origin of the central vessels, tortuosity, opaque nerve fibers, pigmentation of the optic nerve, grouped pigmentation of the fundus, changes of the maculae. S. considers the proof of such correlations as the first step to the investigation of the respective substrates of germ variation, setting this forth in greater detail.

C. Z.

REMARKS TO STRAUB'S THEORY OF EMMETROPIA.—SCHOUTE, G. J., Amsterdam (*Zeit. f. Aug.*, 33, p. 245). According to Straub the development of the infantile eye from hypermetropia to emmetropia occurs in the pursuance of a certain goal, viz. to see far objects distinctly. This is a function of the central organ of binocular vision. A well developed binocular vision arranges the parts of the eye, especially the curvatures of the lens, in such a fashion that far distant objects are sharply focused on the retina. For this purpose the ciliary muscle is innervated to a proper tonic contraction for imparting the required curvature to the lens. Subnormal vision, monocular visual deficiency, anisometropia, in short all phenomena of hypermetropic disease can be explained by weakness of binocular vision.

Schoute tested the binocular vision on a large number of emmetropes and hypermetropes and reports his results in tables and curves. He found that binocular vision is weaker in hypermetropes, as presupposed by the theory, but also how important a part consciousness plays in this theory, perhaps the main part.

C. Z.

RETINA

RETINITIS OF PREGNANCY.—FISHER, J. HERBERT, London, Eng. (*Report of June, 1915, meeting of the Ophth. Section, Royal Soc. Med., Med. Press, June 23, 1915*). The writer does not include in the title the term "albuminuric," as he wished to lead away from the idea that the acute retinal changes were the results of the kidney disorder. Obstetricians now no longer explained the albuminuria of pregnancy as the result of obscure reflex effects of the gravid uterus upon the kidneys, or by mechanical pressure on the ureters. They attributed it, with eclampsia and pathological vomiting of pregnancy, to toxæmic products in the circulation. Eclampsia could not be predicated by any examination of the urine; the effects were especially seen in the quality of the blood and in the blood-vessel walls. In fatal cases of eclampsia, hemorrhages of brain and necrotic changes in the liver were often found, and albuminuria was an effect of the disease on the kidney, not the cause. In the retinitis of pregnancy, the condition of retina was different from that in albuminuric retinitis; as also was its sequel. Syncytio-toxins—products of the disintegration of the syncytium cells—had been found in these cases, and these cells immediately connected the foetal with the maternal structures. The author proceeded to give particulars of a series of typical cases of the condition which had been under his care. In one fatal case Mr. A. C. Hudson made a pathological examination, on the day after death, and found the coats of the eye *in situ*. There was some edema of the nerve head, and in the nasal quadrant of the retina were two large hemorrhages. The microscope showed the sclera and nerve sheaths to be normal, the chief pathological changes being in the large chorioidal arteries, many of which showed gross endarteritis, causing, in some instances, obliteration of the vessel lumen. Some of the chorioidal arteries were normal. Similar pathological changes were found in sections of posterior ciliary arteries surrounding the optic nerve behind the eyeball. Bruch's membrane was everywhere intact, and the retinal pigment normal. The retina and optic nerve head showed evidence of edema, in the former almost limited to the internuclear layer. Rods and cones were almost entirely absent, but this might be attributable to *post-mortem* changes. In the large retinal veins there was pronounced thickening of the adventitial coat. He had found it difficult to group his cases. The rule had been for good recovery of vision to ensue, with the disappearance of all acute manifestations

in the retina, thus differing absolutely from cases of ordinary renal retinitis. In cases in which defects of vision were permanent, this seemed to have been because changes had been produced in the walls of the arteries, or an atrophic condition of the nerve. A recurrence of the retinitis was not necessarily seen when pregnancies subsequently occurred, even though the albumin did not quite disappear in all. One of his cases died after an interval of six years, from cardiac failure; another after $8\frac{1}{2}$ years, of cerebral hemorrhage into the left corpus striatum. In this case the kidneys were found to be of the typical red granular type. It seemed clear, from his cases, that albuminuria of pregnancy was not sufficient alone to set up the typical retinitis of pregnancy. C. H. M.

DETACHMENT OF RETINA CURED BY GALVANO-PUNCTURE OF SCLERA, COMBINED WITH SUBCONJUNCTIVAL INJECTION OF MERCURY CYANID.—JONES, E. L., Cumberland, Md. (*Ann. Ophth.*, July, 1915). The writer comments upon the usual hopeless course in retinal detachment. He gives the history of a patient with this anomaly, aged 54, who had been blind in one eye for a month, hand movements being perceived only in one quadrant of the field. The operation was performed in the office. After thorough application of cocaine and adrenalin, the conjunctiva was grasped by fixation forceps, one prong near the cornea, and the other as far up and out as possible, so that in closing the peripheral conjunctiva was drawn well inward from its true position. A platinum cautery point was applied cold at a right angle to globe as far back as possible, and current turned on until point burned through the inside of ball. This was attended by a spurting up for one inch or more of several drops of a greenish yellow fluid. When forceps were released, the hole in conjunctiva was much further out than the opening in sclera, resulting in a subconjunctival opening in ball, draining out under conjunctiva, and one which could not close for several days. Even after closing, it might probably still be a filtering cicatrix. A massive subconjunctival injection of cyanid of mercury, with dionin and morphin, was added to the galvano-puncture. These processes were attended by only slight pains, and after less than an hour the patient left for his boarding house and had no restrictions put on him as to going where he pleased. The immediate result was that before the eye was tied up he could count fingers at arm's length.

One month later V= $\frac{20}{150}$ and J. No. 14. A year later V= $\frac{20}{75}$ and J. No. 6. Eighteen months later V= $\frac{20}{80}$ and J. No.

3. "the upper and outer quadrant pupil area still full of dust and haze." C. H. M.

CURE OF SPONTANEOUS DETACHMENT OF RETINA BY MULTIPLE SCLERAL PUNCTURE.—WALKER, CYRIL H., Bristol, Eng. (*Report of 1915 Congress of Ophth. Soc. United Kingdom, Med. Press, May 5, 1915*). The writer gives the history of a patient, 39 years old, who had sudden loss of vision in part of the right field with a large detachment above the summit of which was estimated at +12 D. He had 4.5 of myopia. The detachment extended downward. Treatment by means of rest in bed resulted in improvement, but this was only temporary and three months later vision was 6/60. He was ordered to bed again, and five scleral punctures with a discission needle were made 10 mm. from the lower border of the cornea. The retina was pierced at each puncture, and the needle was rotated 90° after the last puncture, to let out some of the subretinal fluid under the conjunctiva. The sight was immensely improved, and he resumed full work a few months later with vision 6/6 with glasses, and a normal field. The condition had been maintained ever since, and the only sign of detachment was the presence of a little pigment below in the chorioid.

C. H. M.

RETINITIS PIGMENTOSA TREATED BY TREPHINING.—MAYOU, M. S. (*Report of the Annual Congress of the Ophth. Soc. United Kingdom, April, 1915. Med. Press, May 5, 1915*). In this condition anything which improved the retinal circulation would temporarily benefit vision—such as the administration of amyl nitrite or subconjunctival injection or paracentesis of the anterior chamber. Doyne had shown that extraction of the lens was followed by immense improvement in vision, due, it was considered, to the fact that the patient was always in a condition of semi-daylight owing to the cataract, so that the retina did not receive sufficient stimulation. Mr. Mayou, while not denying this, thought that the lowering of the intraocular tension, with the consequent flushing of the retinal vessels, and the filtration of fluid through the scar, might be an additional factor, possibly the most important one, in the good result. He thought trephining would result in the retinal vessels being flushed with blood, and that the subsequent leakage might lead to a more rapid excretion of fluid from the eye, and drain away any toxic products which might be causing local vascular sclerosis.

The writer gives the history of a patient upon whom he trephined and in whom there was much improvement in vision, lasting $4\frac{1}{2}$ months. The patient, Jewish, age 17, had complained of night-blindness for two years; various relatives were similarly affected; there was marked pigmentation of the periphery, discs slightly gray, vessels practically normal in size; the fields were contracted to a 10° circle on both sides. Paracentesis resulted in distinct improvement in the fields. Trephining of the sclera of one side caused a reversion of the field to normal within a week and the patient could walk about freely in a darkened room; improvement continued to date ($4\frac{1}{2}$ months). On covering the unoperated eye she could see well at night time; but if both eyes were open she was still somewhat night-blind; he could not advance any explanation of this. The improvement could not be expected to last very long; but it might continue for a length of time which justified the operation in selected cases.

C. H. M.

SPONTANEOUS REATTACHMENT OF THE RETINA AFTER TWENTY-TWO YEARS' DURATION—REPORT OF THE CASE, WITH REMARKS.—DAVIS, A. EDWARD, New York, N. Y. (*Ophth. Record*, October, 1915). Patient, age 18 years, first seen August 12, 1897, with history of a fall from a carriage when six years of age and striking the left side of the head. The author is of the opinion that a chorioiditis of a tubercular nature developed subsequently to the traumatic detachment, and that with the improvement of the patient's health when in the country, the chorioiditis subsided and in the healing process the retina was bound to the chorioid. Davis is inclined to favor the non-surgical treatment in these cases.

G. I. H.

RETINO-CHORIOIDITIS JUXTA-PAPILLARIS.—APPLEMAN, LEIGHTON F., Philadelphia, Pa. (*Ophth. Record*, May, 1914). A name applied by Edmund-Jensen to a localized inflammation involving the retina and chorioid immediately beyond the disc. It occurs in young, healthy adults without a history of lues or other dyscrasias, and presents a characteristic, absolute scotoma involving the region of the blind spot and extending to the periphery. The author reports one case in a male age 21.

G. I. H.

A NEW OPERATION FOR DETACHED RETINA.—TIFFANY, FLAVEL B., Kansas City, Mo. (*Ophth. Record*, March, 1914). The author uses the ordinary small Elliott trephine such as is used in glau-

coma. As soon as he has cut through the sclera and removed the button, the chorioid presents itself. Then grasp the protruding knuckle and with a curved, flat scissors clip it away. A slight amount of the accumulated serous fluid with the vitreous escapes and the retina is forced into the opening of the chorioid, coming into contact with both chorioid and sclera. At this point it forms firm and permanent adhesion. Tiffany reports one case successfully operated upon by him.

G. I. H.

TO THE HISTOLOGY OF DIFFUSE GLIOSIS OF THE RETINA.—GUZMAN, E. (*From the eye clinic of Prof. E. Fuchs in the University of Wien. Arch. f. Ophth.*, 89, p. 323), reports two cases, ending with blindness from iridocyclitis. The left eye of the second case, a man aged 29, was enucleated, on account of severe pain from iridocyclitis with seclusion of pupil and increased tension, five years after the ophthalmoscopic changes were first noted. They consisted of slight redness and haziness of the disc and its surroundings, solid detachment of the retina, enormously thickened vessels, tortuous-like corkscrews, ending at the extreme periphery in a balloon-shaped yellowish formation with red borders. Some vessels showed white sheaths, there was a hemispheric bulging of the macular region with slight pigmentation and fine blood vessels. The most striking ophthalmoscopic changes in this and the cases of von Hippel and Czermak, which it resembled, undoubtedly are those of the vessels, the red nodules which are either aneurysms or agglomerations, and occasionally the apparent transitions of arteries into veins, while the opacity and white discoloration of the retina, its thickening and detachment, and opacities of the vitreous, are less conspicuous, as they are also found in different other diseases of the retina. G.'s case represents a fortunate transition between the vascular and the scantily vascular form of the disease. At the time of the ophthalmoscopic examination the abundant vascular development characterized it as belonging to the type of von Hippel's disease. The histological condition, however, showed in concordance with Meller's description and conception of the disease, a diffuse gliosis with thickening of the membrane and destruction of the nervous elements. The proliferation penetrated at some places the lamina vitrea and choriocapillaris and converted the chorioidal tissue into a glious mass. By this aggressive growth the character of the disease as that of a true tumor is proven. The new formations of vessels play a subordinate part in the disease. The same variations occur in glioma of the central nervous system

with which the ocular disease is identical, and it would be a principal error to surmise a primary angioma on account of the vascularization.

C. Z.

DETACHMENT OF THE RETINA CURED BY SCLERAL TREPHINING.—OHM, JOH., Bottrop (*Zeit. f. Aug.*, 33, p. 288). A man, aged 42, whose congenital nystagmus had been aggravated by miner's nystagmus, showed a flat detachment of the nasal portion of the left retina with a large horseshoe-shaped rupture, covered with hemorrhages. V. with -5.00 fingers at 4 mm. After keeping quiet for five weeks the detachment was now also downward and downward and outward. Six weeks later it occupied the whole lower half of the retina and showed grayish-white folds. V fingers at 3 m. The patient now consented to the previously proposed operation: Bridle suture through conjunctiva near lower limbus in order to be able to roll the eye very far upward. Triangular conjunctival flap downward and outward. Trephining of the sclera with Elliot's trepan downward and outward, about 9 mm. from the limbus, with evacuation of profuse subretinal fluid. Suture of the conjunctiva, moderate pressure bandage and rest in bed for a few days. The first ophthalmoscopic examination after four days showed complete reattachment of the retina. After three weeks V with correction $4/30$, after five months $4/18$, visual field normal.

O. thinks that trephining apparently evacuates the subretinal fluid more thoroughly and permanently than simple puncture with von Graefe's knife and avoids injury of the retina. He believes that in future one will gradually decide upon early operation, as aside of the advantage of the detachment downward the situation is deteriorated by postponement.

C. Z.

SUCCESSFUL OPERATION OF A POST-TRAUMATIC DETACHMENT OF THE RETINA.—VON HIPPEL, E., Göttingen (*Klin. Mon. f. Aug.*, 55, p. 146). The right eye of a man, aged 23, was injured, 16 years ago, by a shot which penetrated the sclera 0.5 cm. downward and inward from the limbus and went out at a point $1\frac{1}{2}$ disc diameters below and outward of the disc. The path of the shot through the vitreous was filled by a round band of connective tissue, behind and in front firmly attached to the walls of the globe. For the last three weeks the patient noticed a gradual deterioration of his sight, due to detachment of the retina in the upper half, which within a week became total. As v. H. attributed the detachment

to the shrinking of the band in the vitreous, he cut this with the fine pince-ciseaux of Luer, which was introduced through a meridional section of the sclera below the tendon of the internal rectus, the wound edges being held apart by fine hooks and the opening illuminated by concentrated electric light. After four days the retina was reattached and remained so ever since, i. e. now for a year. V with $-8 \frac{5}{20}$. Visual field normal. The ophthalmoscope showed the gap in the strand. C. Z.

A CASE OF EXUDATIVE RETINITIS.—VAN GEUNS, J. R., Haag (*Arch. f. Ophth.*, 89, p. 445), reports a case of exudative retinitis of the left eye of a healthy man, aged 47, which showed almost all characteristics of the affection mentioned by Coats (*von Graefe's Arch.*, 81). It also was similar to a case, described by von Hippel as angiomatosis of the retina, in which the behavior of the inferior temporal retinal artery and vein, which were enormously enlarged and submerged into a pinkish and yellow focus at the periphery. Wassermann's reaction was negative, and the etiology was unknown. The fact that v. G. observed a case from inception, in 1904, makes it especially valuable, giving him an opportunity to study the different stages of the disease with entirely different ophthalmoscopic aspects. The resorption of the exudation seems to have reached its termination with atrophy of the retina in the affected portions and contraction of most of the vessels. The intercurrent detachments of the retina at several places have become reattached. As the macula was involved, central vision was 0, but in the normal parts of the retina the patient saw fingers at $\frac{1}{2}$ m. Two plates illustrate the ophthalmoscopic changes. C. Z.

THE CLINICAL ASPECT OF EMBOLISM OF THE CENTRAL RETINAL ARTERY PRODUCED BY RUPTURE OF THE ARTERY IN THE STEM OF THE OPTIC NERVE IN BRIGHT'S DISEASE.—VELHAGEN, C. Chemnitz (*Klin. Mon. f. Aug.*, 54, p. 676), gives the clinical history of a woman, aged 26, who suddenly became blind in her right eye, presenting the typical aspect of embolism of the central artery. Death after five weeks from Bright's disease. The autopsy and microscopical examination of the eye revealed as the cause of the sudden closure of the central retinal artery a rupture of its wall and a hematoma, which under the resistance of the surrounding tissue of the optic nerve compressed the lumen of the vessel to such an extent that the picture of embolism of the central artery resulted. The simultaneous thrombus of the central vein was

secondary and must be considered as marantic or due to stagnation. The hemorrhage was attributed to the chronic hemorrhagic nephritis. This was rendered more probable by the inflammatory changes of the central retinal artery within the lamina cribrosa and its retinal branches, as often found in albuminuric retinitis.

C. Z.

SINUSES AND NOSE

AN UNUSUAL COMPLICATED CASE OF SPHENOIDAL ABSCESS CAUSING AMBLYOPIA.—HARRIS, C. M., Johnstown, Pa. (*Ophth. Record*, March, 1914). A man, age 59, affected in left eye. The sinus was frequently cleansed, finally causing a practical cessation of pus and an absolute relief from the peri-orbital and temporal neuralgia. It can be reasonably assumed that the deflected septum was primarily responsible for the ethmo-sphenoidal disease through interference with drainage and ventilation.

G. I. H.

REPORT OF THREE CASES OF MONOCULAR BLINDNESS DUE TO SINUS OBSTRUCTION, WITH RECOVERY OF VISION.—BROPHY, JOHN A., Philadelphia, Pa. (*Ophth. Record*, July, 1915). Woman, age, 20, loss of vision in left eye. The ethmoid and sphenoid cells found filled with an exudate, a muco-purulent discharge. Following the operation, which consisted of removal of the anterior plate of the sphenoid and ethmoid cells, there was a continued improvement of vision after the third day.

Boy, age 18, loss of vision in right eye. Exudate in the ethmoid and sphenoid cells with a muco-purulent discharge found. The anterior plate of the sphenoid was removed, establishing drainage.

Woman, age 32, loss of vision in left eye. An exudate in the sphenoid and posterior ethmoidal cells, the middle turbinate being large. Whilst the exudate was present on both sides, it was more marked on the left side. Operation performed with success in clearing up the case.

G. I. H.

ON ACUTE OSTEOMYELITIS OF THE FRONTAL BONE IN CONSEQUENCE OF COMBINED EMPYEMAS OF THE ANTERIOR ACCESSORY CAVITIES OF THE NOSE.—WOKENIUS, H., Erfurt (*Zeit. f. Aug.*, 33, p. 283), reports the clinical history of a boy, aged 16, in whom a chronic inflammation of the left antrum of Highmore extended to the left ethmoidal cells and the left frontal sinus. The diploë of the frontal bone became also affected, most likely through a new

infection by very virulent streptococci, leading to a fulminating osteomyelitis, which in spite of operation terminated fatally within four days from purulent meningitis. C. Z.

SYMPATHETIC OPHTHALMITIS

SOME POINTS RELATIVE TO ENUCLEATION OF THE EYEBALL AND SYMPATHETIC INFLAMMATION.—CARPENTER, E. R., El Paso, Texas (*Ophth. Record*, June, 1914). The author favors evisceration, the lining of the sclera being mopped out with pure carbolic acid and the walls of the sclera sutured together, thereby giving more body to the stump and a better attachment for the muscles. Enucleation of this stump can be made at any time if any indication of serious trouble arises. In his experience the effect of this operation is far better than complete enucleation. G. I. H.

TO THE HISTOLOGY OF SYMPATHETIC OPHTHALMITIS.—MELLER, J. (*From the eye clinic of Prof. E. Fuchs in the University of Wien. Arch. f. Ophth.*, 89, p. 437), reports the histologic changes of the second, sympathizing, eye of a man, aged 38, whose right eye was injured in 1902 by an awl. After four weeks the traumatic cataract was extracted, but six weeks later glaucoma set in, and an iridectomy was performed. Suddenly an intense sympathetic ophthalmitis developed in the left eye, with frequent relapses. In September, 1909, he still could read, but a new inflammation in October left the eye amaurotic and painful, so that it was enucleated in May, 1910.

It showed the characteristic histological structure of the infiltration of the uvea, identical with that found in most cases of inflammation of the exciting eye. The iris and the pars plana of the ciliary body were most affected, the chorioid only slightly. The changes of the stroma showed that in the former years there was only an intense infiltration of the iris, and that the ciliary body and chorioid were affected more recently. The pupillary portion of the iris was necrotic in consequence of lack of blood supply caused by the recent intense infiltration of the whole peripheral portion of the iris. C. Z.

INFLAMMATION OF THE EXCITING EYE WITHOUT SYMPATHETIC OPHTHALMITIS OF THE SECOND EYE.—MELLER, J. (*From the eye clinic of Prof. E. Fuchs in the University of Wien. Arch. f. Ophth.*, 89, p. 127). A man, aged 73, became blind in the right

eye, 25 years ago, from an injury by the finger nail. On March 3, 1902, he came to the clinic with chronic inflammatory glaucoma of the left eye. After iridectomy V 6/24. On March 8, 1902, an optical iridectomy was made in right eye. V motion of hand. On November 6, 1902, he came again, on account of inflammation and pain in right eye for several weeks. Lids very edematous, ciliary injection, cornea opaque, iris very atrophic, eyeball amaurotic, soft and painful, enucleation.

The membranes of connective tissue, agglutinating the iris to the cornea, extending behind the iris and covering the ciliary body, indicated a former endophthalmitic exudative process following a perforating injury. Now a recent process occurred chiefly in the choroid. This was very much thickened by a typical exciting infiltration which could still be recognized as resulting from confluence of nodules of typical structure. Their centers consisted of nests of epithelioid cells and the peripheries of lymphocytes.

M. explains the reason why an exciting process without sympathetic ophthalmia is anatomically found so rarely, by the assumption of an endogenous morbid cause timely independent of the injury. The eyes, which were enucleated on account of danger of sympathetic ophthalmia, did not show at the time of enucleation the specific infiltration, as the anatomical examination revealed, but might have developed it at any moment. They contained the soil fit for the development of exciting ophthalmitis, which under still unknown circumstances might have set in endogenously. That such a condition is at all found M. considers well compatible with his theory. For even if we assume that the morbid agent exists in the whole body, and concede that a simultaneous affection of both eyes is therefrom possible and perhaps more frequent than we imagine, one can easily surmise that it is more apt to take hold in the damaged, than in the previously healthy, eye.

Another case is described, the symptoms of which were suspicious, but did not suffice for grouping it under the cases of exciting ophthalmitis without affection of the second eye. C. Z.

TEETH AND EYES

OCULAR DISEASE OF DENTAL ORIGIN.—IBERSHOFF, A. E., Cleveland, Ohio (*Journ. Ophth. and Oto-Laryng.*, July, 1915). A report of two recent cases (three previously) of ciliary disease due directly to decayed teeth and promptly relieved by appropriate and thorough dental work. Each of these cases presented the

classical symptoms of web-like vitreous opacities, plastic deposits on Descemet's membrane, diffuse cloudiness with obstruction of the fundus and great loss of vision.

G. I. H.

CARIOUS TEETH AS A FACTOR IN OCULAR DISEASE.—IBERSHOFF, A. E., Cleveland, Ohio (*Journ. Ophth. and Oto-Laryng.*, May, 1915). Three cases are given in detail where the dental work was required and performed with result that great improvement took place in the existing uveitis.

G. I. H.

REPORT OF A CASE OF REFLEX OCULAR DISTURBANCES DUE TO IMPACTED THIRD MOLARS.—DUTROW, HOWARD V., Dayton, Ohio (*Ophth. Record*, May, 1915). A man, age 22, gave a history of having had several attacks of severe headache, followed by vomiting, which relieved his headache temporarily. At this time he had a complete paralysis of the left external rectus muscle. The right eye was elevated and rotated inward, due to the spasmodic contraction of the superior rectus and the superior oblique. The fundi are normal. After the extraction, the patient improved generally and within a month muscle balance was entirely normal; the gastric symptoms were absent and the headaches were entirely gone.

G. I. H.

TOXICOLOGY

HERPES ZOSTER OPHTHALMICUS AFTER SNAKE BITE.—DE REZENDE, CASSIO, S. Paulo, Brazil (*Brit. Med. Jour.*, August 14, 1915). The writer gives the history of a patient, a woman of 54, who was bitten in the left hand by a snake two weeks previously and within three hours had received a hyperdermic injection of antiophidic serum. Two weeks later there developed a violent attack of herpes zoster ophthalmicus of the right side; this circumstance is noteworthy, because the etiology of herpes zoster ophthalmicus is not yet well established, and the case favors the theory that this disease depends on some toxic agent. The usual symptoms were accompanied by intense pain inside the mouth, with profuse salivation.

C. H. M.

TRACHOMA

THE NATURE OF TRACHOMA.—CRISP, WILLIAM H., Denver, Colo. (*Ophth. Record*, April, 1914). The author reports a case which was markedly improved after a submucous resection of the nasal septum had been performed.

G. I. H.

TREATMENT OF TRACHOMA.—DEWEY, CHRISTIAN, Washington, D. C. (*Ophth. Record*, April, 1914). Dewey has devised a trachoma burr—an olive-shaped burr milled in its entire circumference or having one side smooth. With a rubbing and half turn of the instrument the granules that are so elusive and so resistant to after treatment are removed.

The upper lid is everted and granules removed from the tarsal plate and retro-tarsal fold by placing one blade of the expression forceps (Prince's, Noyes' or Knapp's) in the fornix and the other over the tarsal plate, then, with firm pressure, the granules are stripped from their bed. When the tarsal plate appears to be clear of granules, grasp the superior margin of the tarsal plate with a pair of forceps (Prince's) and make a second eversion, asking the patient to look down. This gives an excellent view of the entire retro-tarsal conjunctiva where the granules are most numerous and gives an opportunity to remove every visible granule.

Having completed the operation the conjunctival sac is flushed with a warm solution of boracic acid or is wiped clean with a cotton pledget, one drop of 1 to 1,000 adrenalin solution and one of 25% solution of argyrol are instilled. G. I. H.

THE TREATMENT OF TRACHOMA.—ALLPORT, FRANK, Chicago, Ill. (*Ophth. Record*, October, 1915). The frequent expression of the lids with Kuhnt's forceps to squeeze the tissues and not to strip them. This is followed by a thorough squeezing process by lavishly powdering the everted lid with boracic acid, and the rather gently rubbing it into the tissues with a small child's tooth brush. G. I. H.

EXPERIMENTS WITH A SPECIFIC TREATMENT FOR TRACHOMA.—LOWENSTEIN, E., Vienna, and HERRMAN, Budapest (*Deut. Med. Woch.*, September 2, 1915). These authors followed Pasteur's idea in his original treatment of rabies. They obtained material for injection by the expression of the follicles from fresh, outspoken cases of trachoma; washed the granules in salt solution and ground them in a mortar; the patients were then injected with this emulsion. Three severe cases were treated by these emulsion injections, while the local treatment was entirely suspended. There was a sufficiently marked improvement to warrant further trial. H. S. G.

TUMORS

A CASE OF SARCOMA OF THE CONJUNCTIVA.—WOLFE, C. T., Louisville, Ky. (*Amer. Jour. of Surg.*, August, 1915). The writer gives the history of a case of this sort and follows this with a brief resumé of our knowledge of this condition, which occurs most commonly at the limbus as an epibulbar growth, usually pigmented, and of which but 80 instances have been recorded. Quoting further, principally from Parsons, he points out that these tumors grow slowly, usually in old persons, though occasionally in young subjects. Such neoplasms are regarded as highly malignant: of 36 cases in which Verhoeff and Loring reported recurrences, metastasis occurred in 8 and recurrence in lids and orbit in 4. The consensus of opinion is that primary enucleation should be resorted to.

C. H. M.

REMOVAL OF EPIBULBAR EPITHELIOMA WITH RADIUM BROMIDE. COLLINS, E. TREACHER, London, Eng. (*Report of 1915 annual meeting of the Ophth. Soc. United Kingdom., Med. Press.*, May 12, 1915). The patient was a man of 80, who presented a new growth, 10 mm. in diameter, at limbus which microscopical examination showed to be an epithelial growth which was extending into and infiltrating the epithelial areolar tissue; it had formed in two years and was gradually increasing in size. Ten mg. of radium bromide on a circular disc 1 cm. in diameter, unscreened, was held continually over the growth for 50 minutes by a relay of assistants. The growth disappeared completely in a fortnight and after five months nothing could be seen except a smooth grayish scar.

C. H. M.

DIAGNOSIS AND TREATMENT OF BONY TUMORS OF THE ORBIT.—WRAY, CHARLES, Croydon, Eng. (Report of the Annual Congress of the Ophth. So. United Kingdom, April, 1915, *Medical Press.*, May 5, 1915). The writer gives Herschfeld's figures showing that the mortality in cases of sinusgrowths—frontal, ethmoidal and sphenoidal—was 48.2, 80, and 100 per cent, respectively; whilst the post-operative mortality was 13.6, 12.7, and 33 per cent. The two main methods of diagnosis were by palpation and the use of Rentgen rays. An examination by fingers was too limited; he advised the use of a thin, flexible spatula 10 mm. wide and 2 mm. thick at the ends; this pressed on the skin under the supraorbital notch, passed 15 mm. under the lid, and via the fornix 33 m.—i. e.,

within 12 or 13 mm. of the sphenoidal fissure. The measurements at the lower orbital margin were 12 and 16 mm. respectively; while at the inner and outer canthus the distance reached was 15 and 21, and 11 and 22 mm.; and as the usual distance from the margin of the orbit to the rectal spine was 45 mm., it was possible thus to investigate half the outer wall of the orbit. In the living subject it was desirable to administer morphia an hour, and deep injections of novocaine ten minutes before beginning the examination. With regard to the operation, he laid stress on the importance of dissecting up the superjacent membrane if present, and the periosteum, so as to shut off, as efficiently as possible, the field of operation from the contents of the orbit. Having tested the hardness of the growth, an attempt should be made to test the strenght of the attachment to the bone, as slight leverage might snap the pedicle. If this did not occur and the tumor was cancellous it should be removed piecemeal, so as to discover its relation to the orbital wall. If originating from a subjacent sinus, and especially if hour-glass shape, the bone should be cut away so as to allow of easy removal in the safest direction. Two important landmarks were the inner canthus (over the anterior extremity of the middle turbinated) and the anterior ethmoidal foramen (giving the level of the cribriform plate). Frontal sinus cases were the most frequent, and usually presented at the upper and inner part of the orbit. No operation should be undertaken in the presence of material alteration of the roof of the orbit as revealed by X-rays. Ivory exostoses could not be removed piecemeal. As in the cancellous variety, gentle leverage was in order, and in the event of failure, sufficient of the orbital wall should be cut away to permit of removal in the safest direction. A clue to the size and location of the growth was obtained by radiography and the use of a strong needle.

C. H. M.

A CASE OF EPIBULBAR SARCOMA.—HANSELL, HOWARD F., Philadelphia, Pa. (*Ophth. Record*, October, 1915). A woman, age 46, presented a tumor on the left eye. Under local anesthesia it was removed entire. Its base was not only firmly attached to the sclera but was a part of it. Eye normal and vision normal at present.

G. I. H.

REPORT OF A CASE OF GLIOMA OF THE RETINA IN A CHILD EIGHT MONTHS OLD.—GLEESON, BENJAMIN, Danville, Ill. (*Ophth. Record*, May, 1914). The conclusion is, that we have a glioma

of the retina, which is probably congenital, and from an early complete operation, may we not hope for a permanent cure?

G. I. H.

FIBRO-ADENOMA OF THE CILIARY BODY.—BRUECKEN, A. J., Pittsburg (*Arch. Ophthalm.*, September, 1915, XLIV, 490), describes a small tumor mass, which was detected microscopically, in the ciliary body of an eye which in the gross showed no evidence of its presence. The eyeball was removed on account of a growth at the inner canthus and involving the eyeball. On microscopic examination no evidence of a nodule was seen in the ciliary body. Microscopically there was found a small tumor, 0.75 mm. in diameter, which the author considers a fibro-adenoma.

Detailed microscopical findings are given and the article is illustrated.

W. R. M.

ON AN INTRAOCULAR SPINDLE CELLED SARCOMA PRODUCED BY A FILTERABLE VIRUS.—STARGAARDT, BONN. (From the Institute for Ship, and Tropical, Diseases at Hamburg, *Ziel. f. Ang.*, 33, p. 256), succeeded in producing a spindle celled sarcoma in the anterior chamber, iris, chorioid, and lids, of the chicken by injecting into the anterior chamber and vitreous with Pravaz's syringe 0.05 ccm. of the opaque fluid, obtained by rubbing with salt solution in a mortar a piece of a tumor of a chicken, of the type discovered by Rous. His inoculations of the same fluid, filtrated through Berkefeld filters, into the anterior chamber of fowls were negative, but the same injection of 0.1 ccm. into the vitreous of the other eye produced a large tumor of the chorioid, ciliary body, and both lids. The morbid agent must be classed under the group of filterable pathogenic germs. It passes Berkefeld filters, endures drying, cold, and heating to 70 C. and glycerin, but is destroyed by bile and saponin. Roentgen rays do not destroy the virus, ultraviolet rays destroy the tumor cells without exerting a noticeable influence on the agent.

C. Z.

VISION AND COLOR VISION

BINOCULAR VISION AND THE OPTIC CHIASM.—POFFENBERGER, A. T., Columbia University (*Ophthalm. Record*, June, 1914). The conclusion drawn is as follows: "Chiasmal image" can be only a figurative expression, while its supposed anatomical and physiological conditions are not verified by histological examination of chiasm. Further, if such anatomical structure were found in the chiasm, it could have nothing to do with the perception of objects

as a result of the functioning of the two eyes. If we assume that binocular vision does depend somehow on the assemblage of fibrils in the chiasm, we would be confronted with the task of explaining the vision of animals whose visual fields are quite separate or partly so, but which still have the chiasm. If, now, the orderly assemblage of fibrils in the chiasm be considered merely as a figurative construction for clearness of exposition, it offers no advantages over the diagrammatic figures based directly upon the retinal images, which require no other assumption than that of corresponding points in the two retinas. Finally, the very assumption of corresponding points has had to undergo revision, with the result that the points have become areas of indefinite extent. Therefore, the exact covering of one point in one image by the corresponding point in the other image at the optic chiasm (which is the assumption of the chiasmal image) is no longer of value either as a working hypothesis or as a figure of speech.

G. I. H.

CONSERVATION OF VISION.—ALLPORT, FRANK, Chicago, Ill. (*Ophth. Record*, July, 1914). The author's recommendations are as follows:

(1) The continuance of a weekly article on the eye for the Press Bulletin of the Council on Health and Public Instruction.

(2) A few more conservation of vision pamphlets on interesting subjects and the increased circulation of these pamphlets.

(3) The continuation of the conservation of vision lectures in the various states.

(4) This committee shall do what it can to inspire the formation of state conservation of vision organizations, either as independent medical and lay societies, or as commissions of the state governments.

(5) That the work of this committee be extended, so that it shall become a potent power in the community. It should have a central office with a paid, interested, intelligent, energetic secretary, who could and would from time to time journey from state to state, upon request, and assist in the formation and perpetuation of state societies for the conservation of vision. His traveling expenses should be paid by those who summon him to the various localities.

(6) The distribution in all schools of crisply and plainly written leaflets concerning the care of the eyes, ears, noses and throats. They should be taken home so that the parents can read them. They should be printed in various languages.

G. I. H.

PHOTAUGLAPHOBIA.—CLARKE. ERNEST, London, Eng. (*The Medical Press*, August 4, 1915). Hitherto we have no word to express a shrinking from the *glare* of light. Photophobia means, literally, a shrinking from light—ordinary light. It is manifested in its most acute form in abrasions or ulcers of the cornea, and consists of an intense contraction of the orbicularis. It is very prevalent in otherwise normal people who are deficient in retinal pigment. Fair people are very prone to it, and its most marked manifestation is to be seen in albinos. Natives of tropical climes and those who have a super-abundance of retinal pigment seldom suffer. Photangeia is the Greek for glare of light, and photaugia-phobia seems to be the best word to convey the meaning.

The writer considers it a much more prevalent symptom than is generally thought and that civilization is responsible for this on account of the more sensitive condition of the nervous system and the use of illumination of greater intensity than during the days of candles and lamps. He discusses the manner in which glare harms the eye and the portions of the eye affected.

Treatment is next considered. Hitherto smoked or colored glasses were prescribed. But since the introduction of Crookes' glass the same result is accomplished without cutting off any luminosity, no unsightliness, and no tendency to render the eyes sensitive. The composition of Crookes' glass "A" and "B" is given. Other important details in the production of gas or electric lights, the decoration of rooms with neutral tints, and the arrangement of beds and seats so that they do not face windows.

C. H. M.

VISUAL FIELD

THE ASSOCIATED CEREBRAL SYMPTOMS IN BILATERAL CORTICAL HEMIANOPSIA.—(*Editorial N. Y. Med. Journ.*, October 2, 1915)

"The lesions causing destruction of the internal aspect of the occipital lobe of the center of vision, are generally extensive, so that it is only exceptionally that cortical blindness exists as a single symptom. Far more frequently it belongs to a group of more or less complex cerebral symptoms; the neighboring cerebral centers, either motor or sensitive, being usually involved as well.

"As a rule, when only a unilateral homonymous hemianopsia from a lesion of the cortical center exists, it is exceptional to find any concomitant cerebral disturbance, and out of a total of fifty-eight cases of cortical hemianopsia collected by Rochon-Duvigneaud, forty-nine presented various associated cerebral symptoms, par-

ticularly a hemiplegia often combined with hemianesthesia and sometimes with aphasia. Consequently, cases are very uncommon in which there are two cortical hemianopsias combined, without simultaneous cerebral disturbances. For this reason there may be paralysis, usually of the monoplegic type, in patients with cortical blindness, or hemiplegia with or without hemianesthesia, or there may be disturbances of speech, word blindness, agraphia, or psychic blindness.

"The intelligence is often weak, and occasionally cerebral disorders acquire such intensity that dementia supervenes. Other patients retain an almost perfect intelligence, there is no paralysis and apparently no mental disturbance, while the memory likewise is intact or nearly so, because it is uncommon not to discover some little lacunae, often of topographical memory, which result in disturbances in orientation. The loss of this sense is a common phenomenon in bilateral cerebral hemianopsia. Thus, the patient of Magnus was unable to describe a road that he went over for several years, and he could not point out the usual places for the various articles of furniture in his room. In the same way the patient of Foerster and Sachs could not direct his steps around his room four years after the onset of his malady; having lost his geographical memory, he could not locate the various European countries, although he had been in the postal service. Other similar instances have been recorded by Laqueur and Chaineaux.

"In conclusion it may be said that the characters of bilateral hemianopsia of cortical origin are an ophthalmoscopic integrity, a normal state of the pupils, and a perfect preservation of the reflexes to light and accommodation; a complete loss of peripheral vision and frequently also of central vision, and the coexistence of disturbances of cerebral origin. In other words, it is a blindness with preservation of the pupillary reflex to light." H. V. W.

SOME UNUSUAL CHANGES IN THE VISUAL FIELDS.—THE RESULTS OF VASCULAR LESIONS IN THE BRAIN AND OPTIC NERVES.—POSEY, W. C., Philadelphia (*Arch. Ophthalm.*, September, 1915, XLIV, 507), describes clinical cases illustrating the following conditions: 1. Permanent quadrant and hemianopic losses following so-called "migrainous attacks." 2. Left eye blind from thrombosis of central artery of the retina. Temporal field of right eye lost from cerebral apoplexy, right nasal field alone remaining. 3. Unilateral optic atrophy and contralateral hemiplegia consequent on occlusion of the cerebral vessels. 4. Monolateral nasal hemianopsia of the left eye from pressure atrophy in conse-

quence of atheroma of the ophthalmic artery. 5. Right homonymous hemianopsia confined to the macular regions from blocking of an end artery in or near the cortical center of the visual area. The cases described are commented upon by the author and the article is illustrated.

W. R. M.

TWO CASES OF TRAUMATIC DOUBLE HEMIANOPSIA WITH PARTIAL RECOVERY.—MILNER, C. E. H., London (*Lancet*, July 24, 1915). Perhaps the chief interest is a psycho-anatomical one, namely, a consideration of the question why there existed a condition of total blindness, and why there has been recovery.

As to the etiology of the condition present in both cases, one of double complete hemianopsia, there are two possible solutions. In both cases there was certainly some actual damage done, i. e., some (probably permanent) injury to the lower part of the cuneus on the mesial surface of the right occipital lobe. Such damage would readily account for the persistent quadrantie hemianopsia. It is for the other condition, that of transient double complete hemianopsia, of temporary total blindness, that there are two possible solutions. On the one hand, this may have been caused by hemorrhage at the moment of the wound, by blood effused along the mesial aspect of the occipital lobes, which by pressure caused immediate total blindness, and later became organized into a small clot. And on the other hand, it may be due, as suggested by Major F. W. Mott, to a profound but passing shock-effect, which made itself felt also in the opposite occipital lobe, and for the time being paralysed the function of the entire visuosensory apparatus.

C. H. M.

THE SCOTOMA OF MIGRAINE.—EDRIDGE-GREEN, F. W., Durham (*Lancet*, April 24, 1915). The writer explains the scotoma of migraine as being produced by a disturbance of the circulation of the eye so that the flow of photo-chemical fluid to the fovea is interrupted; this causes a central scotoma increasing from within outwards. He has, on former occasions, explained that the foveal region of the retina which contains only cones, is sensitized from the peripheral portions containing rods; he illustrates this as follows: "If on awakening in the morning the eyes be directed to a white ceiling, the central portion of the field of vision appears as a black spot, and light appears to invade this spot from without inwards. On closing the eye again a bluish-violet circle appears at the periphery or middle of the field of vision, contracts, and then after breaking up into a star-shaped figure and becoming

brighter, disappears, to be followed by another contracting circle. If the eye be opened when the star figure has formed in the center it will appear as a bright rose colored star, much brighter than any other part of the field of vision. If, however, we wait till the star has broken up and disappeared before opening the eye it will be found that only a black spot is seen in the center."

C. H. M.

HEMIANOPIC DISTURBANCES OF THE VISUAL FIELDS AFTER GUNSHOT INJURIES OF THE SKULL.—AXENFELD, TH., Freiburg (*Klin. Mon. f. Aug.*, 55, p. 126), reports 8 cases, 4 of which were double-sided. One of these was a case of hemianopsia interior caused by a tangential shot without perforation of the bone on the right side of the occiput, affecting both visual centers, by hemorrhages or splintering of the bone. In 4 cases the lower halves of the visual fields were predominantly, but not exclusively, defective. A. also observed asymmetries of the visual fields and attributes them to exhaustion of the patient during examination. Then, at first often complete, amaurosis disappeared in all cases. Papillitis in one case was not caused by cerebral abscess, but A. thinks that the traumatism by itself, the effect of the destroyed brain substance and hemorrhages may suffice for creating optic neuritis. If of longer duration however the formation of a brain abscess may be suspected. One patient with doublesided hemianopsia after a tangential shot complained of hallucinations in the defective visual half. From these A. inferred that even in injuries in the immediate neighborhood of the cerebral cortex the phenomena of defect are not necessarily merely cortical and do not indicate complete destruction of the cortical parts.

A. emphasizes that a shot may act differently on the intracranial contents according to location, direction and distance, and that therefore from shot injuries of the occiput, if there are no anatomical examinations, principal conclusions for the finer topography and physiology of the visual paths and centers, especially with regard to unsettled questions, can be drawn only with greatest precaution.

C. Z.

CONTRIBUTIONS TO THE HEMIANOPIC DISTURBANCES OF THE VISUAL FIELD AFTER GUNSHOT INJURIES OF THE SKULL. ESPECIALLY THE OCCIPUT.—UHTHOFF, W., Breslau (*Klin. Mon. f. Aug.*, 55, p. 104), reports his personal experiences on 9 cases of injuries in the present war. U. estimates the frequency of injuries of the eyes and visual disturbances as 8% of all war injuries, due to

the fighting in trenches where only the head is exposed. About 9% of all injuries of the visual organ are gunshot injuries of the skull with hemianopic disturbances. In 5 out of 9 cases the hemianopsia was doublesided, and in 2 of these there was hemianopsia inferior, caused by a transverse direction of the shot immediately above the visual center or through the upper portion of the optic radiation. Both cases spoke for the assumption that the upper lid of the calcarine fissure corresponds to the upper parts of the retina and the lower portions of the visual fields. The occurrence of doublesided hemianopsia inferior by a direct injury is not surprising, while it has hardly ever been observed after thrombotic softening or hemorrhages of the brain, owing to the peculiar vascular supply of the visual sphere, respectively of the visual radiation. Occasionally a certain asymmetry in the intensity of the functional disturbance in the hemianopic visual field was observed, which U. attributes to exhaustion of the patient during examination. Also in doublesided hemianopsia central vision was partly preserved, frequently however very much reduced immediately after the injury for from $7\frac{1}{2}$ hours to 4 weeks, but later on improved. No permanent complete amaurosis occurred in U.'s cases. The restoration from the disturbances of sight and visual fields in all cases was considerable. The ophthalmoscopic condition was negative in one-half of the cases, but partly became pathological later on (optic neuritis, papillitis) from intra-cranial complications, usually abscess. The optical memory and sense of orientation, as far as not encroached upon by the defects of the visual fields, were well preserved in all but one case.

In one case violent neuralgia of the right occipital nerve, apparently due to retraction of the scar, was observed and cured by injection of alcohol. Permanent pain of the whole side of the head in another case was attributed to a central cause. None of the cases showed ocular palsies.

C. Z.

Book Reviews

An Introduction to the Study of Color Vision.—By Parsons, J. Herbert, D. Sc., F. R. C. S., Cambridge: at the University Press, New York. G. P. Putnam's Sons, 1915.

The author has endeavored to separate the best established facts of color vision from the theories and then discussed the chief theories in the light of facts, taking up the bases of color vision in the spectrum, regional, temporal, areal effects and then the evolution of color vision, starting with the psychology, experiments upon animals, showing that most of them are comparatively color defective.

The color vision of primitive races is likewise defective and civilization seems to be developed the perception of colored tints, certainly this is shown in children for they do not distinguish color tints at an early age, some of them even up towards the end of the second year, although there is good evidence that at the age of three months, an infant may experience the sensations of red, yellow, brown, green and blue, yellow and red being distinctly preferred. However, infants are susceptible to relatively small differences of brightness. The outstanding characteristics of all known abnormalities of color sensations is that the abnormal people see fewer hues than the normal. The great difficulty in arriving at a true conception of the relationship of any abnormal color system to the normal is psychological. No individual can judge with certainty the sensations of any other individual, therefore, it should be clearly understood that the name of the color when used for various color sensation must not be relied upon as accurate criteria of their sensations as compared to the normal.

The author accepts the descriptive terms of protanopes, "Red:" denteranopes, "Green:" and tritanopes, "Blue-blind," but there are other forms of color blindness, reaching even to totality or monochromats.

He then goes on to discuss the various theories of color blindness. The book is well bound and printed.

H. V. WÜRDEMANX.

Nursing in Diseases of the Eye, Ear, Nose and Throat.—By the Committee on Nurses of the Manhattan Eye, Ear, and Throat Hospital. Second Edition, thoroughly revised. Philadelphia and London, W. B. Saunders Company, 1915.

Several years ago, I most favorably reviewed the first edition

of this book and since that time, have used it for the instruction of nurses with much satisfaction.

It is a treatise which is not only recommended to the Nurses themselves, but to Oculists generally for the instruction of private nurses as well as in classes at the Hospitals.

While most of the Specialists' bed-patients are seen in the Hospital rooms or wards and are attended to by nurses whom he may have opportunity to directly instruct, yet there is a proportion that have to be treated at their homes by the aid of nurses, either trained or otherwise, and with the latter class, the study of that portion of the book, which deals with the particular case may be of considerable benefit to the patient.

H. V. WÜRDEMANX.

Transactions of the American Ophthalmological Society.—Volume XIII, 1912-1914. Philadelphia, American Ophthalmological Society, 1915.

Perhaps the most important of these essays are those by Sattler and Harrower on "Glaucoma," on the "Electric Ophthalmoscope" by Claiborne and by May and several papers on "Tumors of the Eye" by Verhoeff, Bedell, Hansell, Capron, Weeks, Hedd, Knapp and de Schweinitz.

H. V. WÜRDEMANX.

Surgery of the Eye.—A treatise by **Török, Drs. Ervin, and Grout, G. H.** (A Cuban review.)

These two young New York surgeons have published in a volume of over 400 pages and with 509 illustrations, a work that should be read alike by the student and the practitioner.

We met Drs. Török and Grout at the Ophthalmic Hospital 55th Street, corner of 10th Avenue, that was built in *memorian* of the eminent Herman Knapp, who was one of the disciples of the great De Graefe, that has contributed more to the renaissance of Ophthalmology.

At Dr. Knapp's side, Arnold Knapp, who has inherited the virtues and activities of his father, Drs. Török and Grout have found a large field to develop their aptness in Ophthalmology. Science can not be effectively improved, were it not for the ceaseless laboring in the clinic, as happens in the places where every need is met with, in order to render the surgeon's hand every time more proficient and utile.

We not only met at the hospital Drs. Török and Grout, but also saw them operate several times, because they belong to the staff of the above mentioned hospital. On that account we were

able to know, before reading their book, much of what is written on it; and it is very pleasing to us that have seen the disappearance of many illustrious masters who during the last thirty years of the past century have done so much for the actual advanced stage of Ophthalmology, to see their labor seconded.

The book is clearly written and every word of it counts; no practical detail is omitted because it is not an imaginative work, but the result of personal observation at the bedside of the patient, before and after operation. That is why its first chapter on the "surroundings and general preparations for eye operations" in which they describe the preparation of the patient and of the instruments and their use, is very useful especially to those not initiated in the specialty.

Török and Grout, before coming to New York, had practiced during fifteen years at Budapest, in the clinic of the Hungarian Royal University, under Professors W. Von Schulek, E. Von Grocz and L. Von Bashovus, all well reputed and in Berlin, under Professor J. Hirschberg, whose competency is to be compared only to his agreeable character for once seen one can not forget his brotherly ways. In editing this work its authors have had in mind similar books written in Europe as "Die Augenärztlichen" by Czermak and "Le Chirurgie de l'oeil," by Terrien, etc., and to that reason is due the equal quotations on European and American procedures.

We shall limit ourselves to mention the titles of the different chapters, giving in that way a slight idea of its contents, it being impossible to describe in detail, for that would oblige us to copy the whole volume, such is the great interest that its reading produces in our mind, for every one of its chapters is greatly interesting. *Chapter I.* Surroundings and General Preparations for Eye Operations. *Chapter II.* Instruments and the Managements. *Chapter III.* Surgical Anatomy of the Eyeball. *Chapter IV.* Operations in the Cornea. *Chapters V to VIII.* Operations on the Sclera, Iris, Lens, Eyelids, Lacrimal Organs, Conjunctiva, Globe Muscles and Orbit. *Chapter XIV.* Removal of Foreign Bodies.

J. SANTOS FERNANDEZ.

A Visit to New York and Its Eye Clinics.—Fernandez, Dr. Juan Santos, describing something of its scientific life. Havana, Cuba.

Under the modest heading thus described, the author gives in an extensive work, the description of the different New York institutions where the diseases of the eyes are taken care of. In the

same work he pays attention to the many competent men that figure at the head of Ophthalmology in New York.

The author's work has been made easier by the fact that he knew the last reign of many of the old teachers who were the legitimate heads of the last generation, among which were Agnew, Roosa, Loring, Noyes and others who paved the way for the current progress of Ophthalmology in the Imperial City.

By the privilege of age, the first place corresponds to the New York Eye and Ear Infirmary where the ophthalmic activities are never ending and the attendance of patients overtakes the capacity of the place that has been enlarged more than once since its foundation in 1820 and which even now is in need of further enlargement as the new patients have little space given to them, for the whole building is almost given over to those needing an operation. Many noted ophthalmologists have always been connected with this hospital; since old times Callan, associate of the late Dr. Gruening; Lambert and more recently Weeks, who has an international name; Reese who is an able surgeon and very expert clinician; Fridenberg, very competent—and many others. The Manhattan Eye and Ear Hospital until 8 years ago was in Park Avenue, has been moved to a better place and in spite of its recent enlargements it will soon be enlarged again to meet the demands of the three different specialties that are taken care of. Among the noted colleagues that practice there, the author mentions Dr. Edgar Thomson, whom he saw operating with great skill. The laboratories of this hospital are under the direction of competent men.

The hospital founded since his arrival at the United States by Dr. Hermann Knapp, of immortal fame, has been removed and newly built by his son and it meets all the requirements. Dr. Arnold Knapp, its director, has surrounded himself with men like Török and others who pay their prestige to the hospital.

In the Eye Department of the Mt. Sinai Hospital, the surgeon in charge, Dr. Charles H. May, whose work "*Manual of the Diseases of the Eyes*," gives him credit as a master, has as an associate Dr. Wolf, who is also very competent. There is nothing wanting there and although it is not very large, every requirement is met with.

Ophthalmology in New York according to the author could constitute a definite school, as that of Vienna at the end of the eighteenth century and the material and intellectual elements which can be made use of are many, because it is a progressive city whose institutions improve daily. The author has visited several times New York, during a long period of time and is an eye witness to

its scientific progress. Five and twenty years ago, he says, there were there some eminent men at the head of Ophthalmology and although now those are not the same, their heirs are so self efficient as them and in a larger number.

New York eye men in some respects hold their ground equally with men of other nations as in Interstitial Keratitis and Glaucoma, for example, while in surgical procedures on the muscles and the lens especially, they are at the head of the profession. In cataract operation there is an unanimous tendency towards reuniting in one method all the advantages of Ophthalmology. This consists according to the author in making the points where the knife is to enter and to emerge upon the conjunctiva, as well as the flap itself, leaving always a conjunctival flap, for they seem to be convinced that it constitutes a security against future complications as well as the means or rendering easier the soldering up of the borders of the wound. The Keratotomy is made above the transversal diameter of the cornea: the corneal flap being somewhat smaller than that of Daviel, but much larger than von Graefe's. Iridectomy is regularly done and the capsule of the lens is pierced with some *ad hoc* forceps and with the cystotome of von Graefe, trying to leave the anterior chamber as free as possible from any cortical material.

In the surgical treatment of Glaucoma, the author observed that the American surgeons utilize the advantages known since Desmarres and von Graefe, which were perfected by De Wecker and later by La Grange and Elliot. La Grange's operation is resorted to when the iris can be excised and Elliot's is made when the iritic adhesions do not allow an iridectomy to be done.

But where the author has seen a natural and marked tendency towards creating an school of their own is in cataract operation and it could be called the American method, he says.

DR. JUAN SANTOS-FERNANDEZ stay in New York lasted three months and there he met the best authorities on Ophthalmology and he announces in this work that he soon will be able to read before the Havana Academy of Sciences, whose president he is, a larger paper entitled "Ophthalmology in the United States," with greater fate than those exhibited in the work than under the same heading was read by him in 1886. He also mentions his intention of improving that work by visiting the different regions of the United States and will also publish in English the actual satisfactory conditions of Ophthalmology in Spain and derivative countries of Spanish speaking population.

FRANCISCO M. FERNANDEZ.

Obituary

DR. EDMUND RIVERS.

Dr. Edmund C. Rivers of Denver was drowned October 24th at 9:30 a. m. in Barr Lake, Colorado. He was returning with an attendant in a small boat from a sand bar in the center of the lake where he had been shooting ducks since sunrise. There was a strong wind blowing and the lake being a large one the waves were running about four feet high. The boat was formerly used exclusively as a rowboat but had been converted into a motor-boat and the motor caused the rear end of the boat to sink rather low in the water. No one saw the accident. The boat was found only a short distance from the sand bar with the prow sticking up out of the water because of the weight of the motor dragging down the other end. He was accompanied by a young negro man, and their bodies were not recovered for several days. Dr. Rivers was not heavily clothed, having on a sweater and hip boots, no shells in pockets. The negro did not have his shoes on and wore his usual clothes. They were both good swimmers. Dr. Rivers was an unusually powerful man. He did not wear an overcoat in the coldest winter weather, hence it is difficult to understand why he could not get to the boat and cling to it until assistance came, for the accident was discovered shortly after it occurred.

Dr. Rivers was a bachelor with plenty of money and enjoyed living. He was very fond of outdoor life and the big sports that go with it. Cold and hardships had no terrors for him. He ate practically one meal a day, but that was a large one. I have heard him say that a turkey was an unsatisfactory bird because it was too large for one and not large enough for two. He was quick witted and very fond of putting something over on the other fellow. He made one of the best toast-masters I have ever seen. For many years he took a keen interest in medical society and medical school affairs. He was dean of the Denver and Gross School of Medicine a few years before consolidation with the University of Colorado and had been president of our county and state medical societies. He had at one time or another been ophthalmologist to all our hospitals. He was a great reader and left a very fine general and medical library.

His judgment in ophthalmology was conservative and sound, and was respected by his confreres.

We shall miss him in more ways than one. On winter mornings

as we in fur coats and in automobiles make our hospital visits we will miss seeing Rivers, no vest, coat wide open, pounding along on foot, arms swinging, face aglow, a perfect picture of power and energy as he completed a walk of six miles or more. We used to hail him and ask, won't you ride? and hear him smilingly refuse. We soon learned not to ask him to ride and were content to fling at him, how are you coming this morning Rivers? and never tire of his reply which was always different and always worth hearing. The last he ever gave me was, "poorly, poorly. I don't get enough to eat." As far as known there are no photographs of our late friend extant.

MELVILLE BLACK.

Notices

The stand France has taken and is still keeping in this war, which she of all nations wished for the least, has given to her the admiration and sympathy of many neutrals if not of the world. One of the many horrible consequences is the production of a number of blind men in the vigor of life. What this means is unnecessary to explain to our readers. What especially France is trying to do, can be found in an article of the First of October number of the *Revue des deux Mondes*—*Can you not help some of these poor devils?*

We do not know all the misery wherewith the world is loaded, but in this time of great calamity but also of great upheaval many things come to the fore of which in ordinary circumstances we do not even dream. There are enough men in the trenches, who, during the entire war, have not received a single individual sign that their conduct is appreciated—because they are alone in the world. Brieux wrote a letter, “à ceux qui pas de parents,” to those who have no parents; but that was in the beginning of the war. Many, to whom this letter was written, are still along the living.

Will you not combine so that we are able to give these heroes a sign of sympathy, that is, that we understand the hard times they have gone through and are going through?

There are wounded and blinded men who do not possess anything and have to create something to keep living, handicapped as never before.

Can't you help them?

Many of you will already have shown their sympathy substantially, having friends in the profession in France. But *we* want more, and *you* want to know that every cent you will give, will be used skillfully and sympathetically and not squandered on dignitaries, offices, furnitures a. s. At least some 1,500 blind soldiers are in Paris according to the above mentioned article in the *Revue*.

The intention is to send money directly to Dr. H. Villard, 4 Rue Maguelone, ophthalmologist at Montpellier, who himself directs a hospital and who is willing honestly and conscientiously to do the rest.

Kindly send your contribution to the offices of *Ophthalmology*.
E. E. BLAUW.

An unfortunate error in binding occurred in the October, 1915. issue, in which the illustration of Triple Rupture of the Chorioid with Iriodialysis, by Dr. Leighton F. Applemann, was bound in opposite page 66 with another author's name.

With this number, will be found an additional illustration properly labeled which may be inserted opposite page 80.

H. V. WÜRDEMANN.

OPHTHALMOLOGY

ESSAYS, ABSTRACTS and REVIEWS

Vol. XII.

April, 1916.

No. 3.

Original Articles.

MIRROR WRITING.

SAMUEL HORTON BROWN, M. D.,
PHILADELPHIA.

(Clinical Report of a Case Illustrating the Ultimate Result.)

A recent paper by E. P. Calhoun (Ophthalmic Record, September, 1915) of Atlanta, Georgia, carefully reviews the literature of this novel condition and relates the history of a seven-year-old boy, normal in every respect, except for some adenoid tissue in the nasopharynx, and a slight amount of hyperopia, who presented this curious way of expressing himself in writing. He was able to read his reversed writing. He, also, had learned to write in the orthodox manner with his left hand. Ultimately he acquired the ability to write as other people, with the right hand.

The case that I wish to add to the literature of this subject, has to do with a colored boy, aged about ten years, who was placed in a class of boys in school of about the same age, and who was considered a dullard, until a painstaking teacher discovered that his work, when it was learned how to interpret it, was of fair average. Unfortunately, it was quite a while before the teacher discovered this peculiarity of expression. Through the courtesy of one of his teachers, Miss Martha W. Lanning, of Bridgeton, N. J., I am able to present evidence of his work extending over a period of three years.

It will be noted in the serial exercises, that is to say where the exercise is copied from the board and then repeated several times on the paper, that they are exactly the same. The phenomenon known as physiologic rhythm has been brought into action. It is interesting to speculate as to the character of the writing had the subject paused for a definite interval, read his work, and then proceeded to copy it, but in none of these exercises do we find anything to suggest that this has occurred. In the later exercises he shows a

tendency to part with the old style reluctantly, as is evidenced by the date.

An attempt to elaborate upon the bibliography furnished by Doctor Calhoun has met with no encouragement, since that writer has included everything of value, even to this date.

The interesting feature of a case of this character is not the occurrence of the anomaly and its subsequent involution, or evolution, depending upon how it is looked upon, but the fact that a teacher would recognize the condition and thereby aid the youngster to keep fairly abreast with his fellows until the proper development had taken place. The saving to the Public School Department, and subsequently to the community by this little thought by the teacher is enormous. The course of the condition extended over about three years from the time it was first recognized. This is the average duration. But this case occurred in the person of a poor boy, in a small city, and had not the forces back of him to take care of him that a white boy of the not-quite-so-poor class would have.

With great difficulty, as it was, to take the time to make allowance for his deficiencies, he did not progress, as classes go, and he was compelled to stay two years in the first grade, and two years in the second grade, but it was thought advisable to promote him to the third grade, and immediately improved in every way.

2	8	9	1	5	2	8	9	1	5
9	4	1	1	1	9	4	1	1	1
—	—	—	—	—	—	—	—	—	—
11	12	16	14	12	11	12	16	14	12

Exercise of Nov. 30, 1912, as it appeared on the blackboard.

The same exercise as it appeared when copied by the pupil several times.

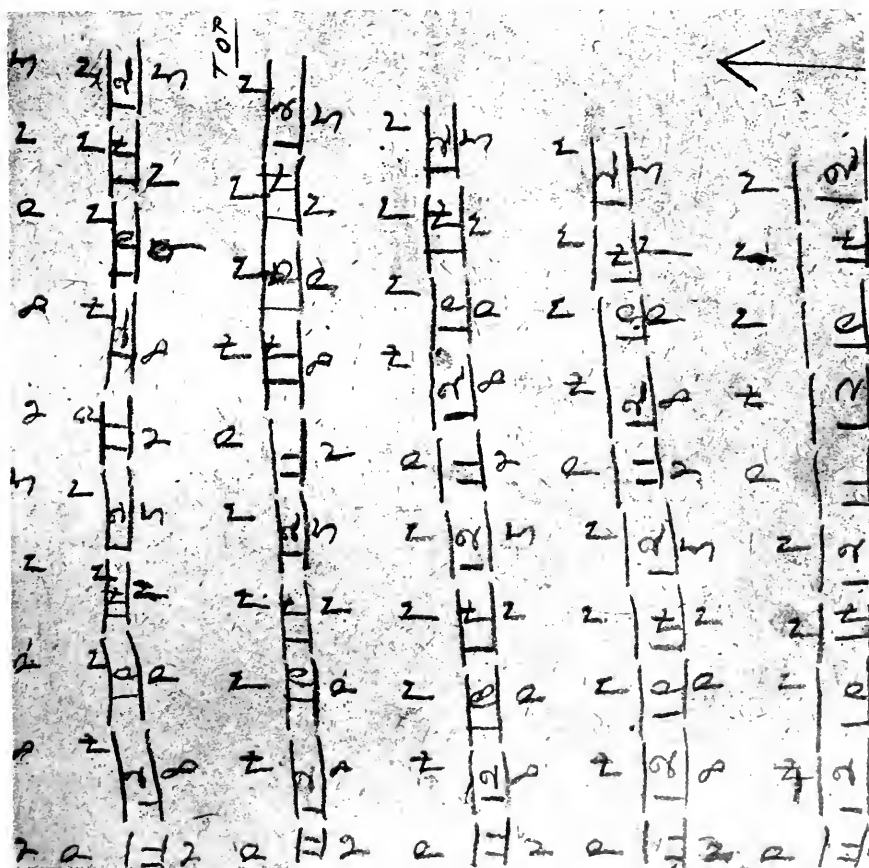


Fig. 1

3	1	3	2	2	3
2	2	2	2	3	2
1	3	2	3	2	3
<hr/>					
6	6	7	7	7	8

3	3	3	4	3	3
3	3	4	1	1	2
2	3	1	3	4	4
<hr/>					
8	9	8	8	8	9

The exercise as it appeared on the blackboard.

The exercise as it appeared when copied by the pupil in 1914.

3 2	2	3	2	2	3
2	2	2	2	3	2
1	3	2	3	2	3
<hr/>					
6	6	7	7	7	8

3	3	3	4	3	3
3	3	4	1	1	2
2	3	1	3	4	4
<hr/>					
8	9	8	8	8	9

Fig. 2

The exercise of Wednesday, October 8, 1913, consisting of writing the letter q, appeared with the date as follows:

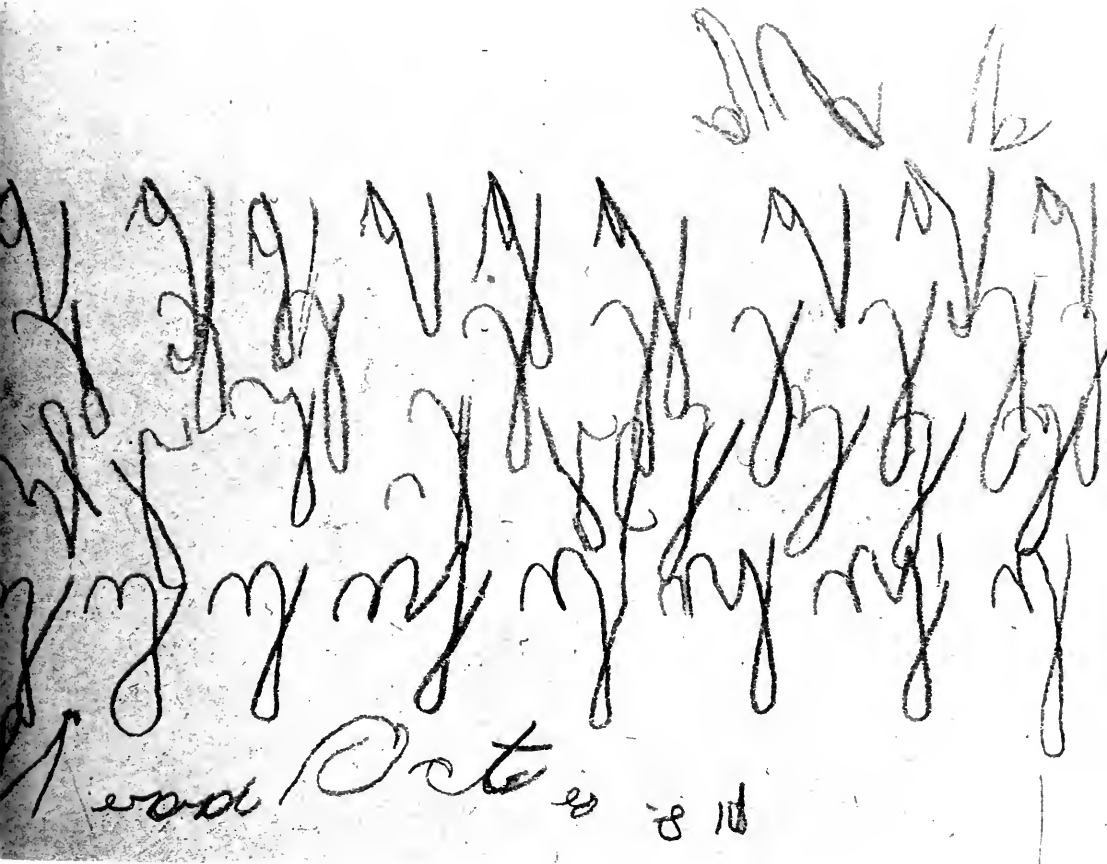


Fig. 3

In October, 1915, we find that the visual interpretation permits of work of this character:

L. Goldsborough Authentic Oct 14 1915
 1968 2937
~~2984~~ ~~7904~~
 2473 7546
~~430~~ ~~3520~~
 3426
~~2016~~

Fig. 5

Exercise copied from the blackboard in October, 1915.
NOTE THE CHARACTER OF THE DATE.

broad attend attend attend attend
 ingush.
 V me St. V me St. V me St. V me St.
 for 12/11/14. No school school school school

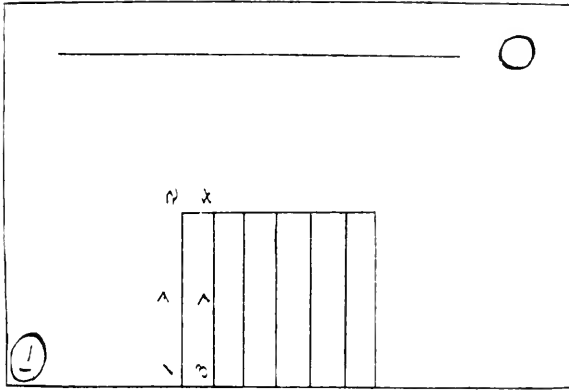


Fig. 7a

Position of patient at school desk, with direction of writing indicated by arrows.

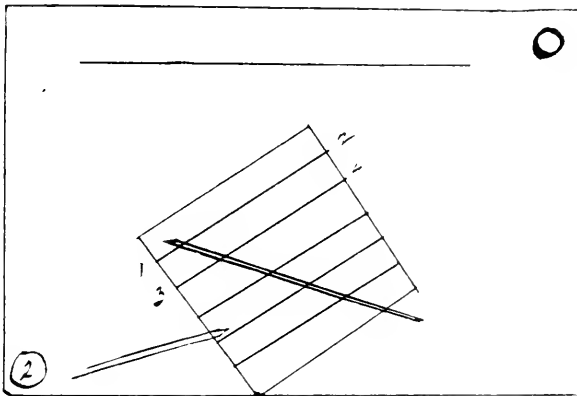


Fig. 7b

Showing the position of the paper on the desk, as directed by the system of instruction in this particular school. The upper pencil is held in the normal manner; the lower pencil is held in the same manner as the patient holds his.

This patient has always written with his right hand, although he has some of the habits of the left handed child, such as writing apparently from above the line, and pointing the pencil towards himself. In the upper diagram is shown the manner in which he places the paper, and the direction which his writing takes, from below up. In the lower diagram is shown the manner required of the pupils in that school. The medical inspector has recorded this boy's vision as normal in each eye, and there is no strabismus. His brothers while slow in their school work show no similar peculiarities. He would invert everything taken from the board, but would read correctly from his own transposition. His age is now ten years.

1901 Mt. Vernon St.

*THE RELATION BETWEEN SURGICAL OPERATIONS ON
THE EYEBALL AND PYÖRRHEA ALVEOLARIS
(ALVEOLODENTAL PYÖRRHEA).

L. WEBSTER FOX, M. D., LL. D.

An invitation to deliver an address before the annual meeting of the Chicago Ophthalmological Society I consider a great honor and I value it all the more when I remember the list of distinguished men whose names have from time to time been inscribed upon the guest roll. I thank you for the honor.

The subject of this paper has been of such interest to me in my private, as well hospital work, especially the latter, that I have taken the liberty to make it the topic of my discussion for the evening.

Operations are carried out so carefully today that when disaster overtakes us we are not only shocked, but appalled at the outcome, and at once ask ourselves the question: Have we taken all precautions to prevent such a calamity? Have we done our full duty to the patient and thoroughly examined all the tissues adjacent and connected with the eyeball? From time to time all surgeons, and especially ophthalmic surgeons, must have their cycles of disaster, not from any cause of their own, but from some inherent body defect, which lodging in that particular patient, brings about the calamity which is beyond our ken. One operation after another has progressed splendidly, with a successful termination; then suddenly a series of unfortunate cases follow each other and we fall from grace and recognize that we are not like the Pope—*infallible*. In our next series of cases following this cyclone of trouble, we seek the aid of the laryngologist and have him explore the nasal cavities and accessory sinuses, nor do we stop here, but the teeth and buccal cavities are also carefully inspected before placing the patient upon the operating table.

Not only does there exist a fixed relation between the teeth and the eyes, through the medium of the fifth cranial nerve, so that affections situated at the termination of its maxillary branches may readily be referred to the terminal filaments of the ophthalmic branch, but inflammatory processes of the dental roots may also extend to the maxillary sinus, and thence to the orbit by continuity or contiguity of structure. Moreover, any infection of the teeth may be transmitted through the lymph channels, and ultimately find lodgment in the interior of the eye.

*Delivered before the Chicago Ophthalmological Society, January 17th, 1916.

Onodi speaks of the transference of disease through the bone from the mucous lining of the accessory sinuses to the lacrimal organs, both the venous network and the lymphatics play a part. The venous spaces in the nasal mucosa communicate freely with the mucous lining, both of the accessory sinuses and the nasal duct. The venous spaces of the nasal duct and lacrimal sac anastomose with the facial ophthalmic and infra-orbital veins. It can be easily understood how infection thus focused may ultimately find its way into the recently operated eyeball.

Many ocular complications are due to constitutional diseases. Most of these diseases are infectious in origin, the infection being either ectogenous or endogenous. Infections that gain an entrance through the mucous membrane may directly infect the conjunctiva, while infections of endogenous origin may react on the globe through metastasis or by means of toxins. It is extremely important, when contemplating an operation on the eye, to take steps to protect the patient from the results of such so-called secondary infections. This fact has been impressed upon me by a number of cases that I have seen during the last fifteen years in connection with a large out-patient department; and it is my habit, therefore, before undertaking an operation upon the eye, to see that careful attention is given to the nasal cavities, accessory sinuses, teeth, etc., so as to eliminate any possible focus of infection.

There is one source of special infection so universal that mention must be made of it. This infection is through the mouth. There are numerous bacteria that flourish in the mouth and the secretion and the mucous membrane do not seem to have the protecting powers noticed in the other parts of the body.

Dental caries is a chemical process and affects the tooth proper. Pyorrhea or Riggs' disease (first published by Dr. J. M. Riggs, Hartford, Conn., in 1844), affects the tissues surrounding the root of the tooth and is accompanied with the infection by pus bacteria, and possibly also by animal parasites—*endemeba*. As has been said above pyorrhea is an affection of the gum or tooth sockets. It begins at the point of attachment of the teeth to the gums, and where there is an accumulation of tartar, or lime deposits, or an injury has occurred, or the lack of hygienic surroundings, the soil is fertile and susceptible to infection. Another reason may be ascribed to the resistance of the individual. As infection progresses a pocket is formed around the root of the tooth and it becomes loosened. Unfortunately, the evil does not end here, pus is continually being formed, and discharging into the mouth and then swallowed. The teeth having become loosened the bacteria

is forced into the circulation and may be carried to distant parts, and there they select the most fertile tissues in which to settle and thrive. I have no doubt we would be shocked if we knew the number of infectious diseases that have their origin in the mouth and from the teeth especially. One of the most dangerous dental infections, as before mentioned, is that of pyorrhea alveolaris, of which there are a number of different varieties. Not only may this infection be transmitted into the eyeball itself, but the pus from it may appear under the conjunctiva and around the lips of an operation wound. This may often explain the bad results that sometimes follow the apparently successful performance of an operation for either glaucoma or cataract. Therefore, in extremely severe cases of pyorrhea, I have not hesitated to have the teeth removed before undertaking the operation on the eye, or, at least, place the patient in the hands of a competent dentist who decides the necessity for this radical measure.

This infection is so wide spread that it is practically universal, and it is the cause of more than 50% of all the permanent teeth that are lost from any cause. The slow and incipient nature of the disease results in its presence usually not being suspected until irreparable damage has been done, and often not until many teeth are practically lost. The most successful treatment of this disease will naturally depend, as in other diseases, largely upon a knowledge of the specific cause of the disease, the manner in which this agent produces the disease process, and finally acts on the causative agent.

Though diseases involving the teeth are always of special interest to the dentist, pyorrhea alveolaris with its suppurating process in the mouth, the possible effect of absorption of infections and toxic substances, and the harm that may come from being unable to properly masticate the food, is of special interest to the family physician and ophthalmic surgeon as well.

After much discussion as to the proper term to be given this disease, and after taking into consideration the tissues involved, and also the pathologic conditions the one of alveolodental pyorrhea seems to be more fitting. The term pyorrhea alveolaris is claimed by some dentists to be misapplied, and it is only correct when speaking of the advanced stages of the disease. It seems that pyorrhea may exist for years before it involves the alveolar bone. In the early stage the peridental soft tissues above the alveolaris are alone involved. The definition is "a destructive disease of the supporting structure of the teeth." The causation, *endemoeba buccalis*.

In 1849 Gros described an ameba found in the mouth of adults

and gave it the name of ameba gingivalis. Sternberg in 1862 found ameba different from the free-living ameba—this was called ameba buccalis. Karulis found in Egypt an ameba in suppurating tumors of the jaw, which he thought to be the causative agent. Some authors say that the ameba are not pathogenic, but were in reality an adjuvant to the auto-disinfection of the mouth. Middleton and Barrett, in the *Journal A. M. A.*, Vol. 43, No. 20, report the finding of endamoeba buccalis in chronically inflamed tonsillar tissues, and that the condition was greatly benefitted by the hypodermatic use of emetin. In addition to the above mentioned type we find the endamoeba coli, particularly in preparations from the surface of the lesions, or from deposits upon the buccal mucous membrane.

In pyorrhea, lesions occur around the teeth of almost all human adults, as well as in many young people, and also in the follicles of diseased tonsils. It is the source of other systemic diseases—rheumatisms, endocarditis, septicemia, etc.

The opinion is held by quite a good portion of the medical profession that pyorrhea is the source of various systemic diseases. We are not prepared to express an opinion one way or the other. The fact that the patient, who is suffering with one of these systemic diseases also has pyorrhea, is not sufficient evidence that there exists any etiologic relation whatever between them, because practically all other grown people who have not systemic diseases have pyorrhea also. On the other hand, it would seem that the chances of pathogenic bacteria reaching the blood through pyorrhea lesions are great. Most pyorrhea pockets contain one or more species of pathogenic bacteria, staphylococci, streptococci, pneumococci, diplococci, etc. As for pus one can obtain one or two drops from a pyorrhea socket by massaging it, and after five or six hours a similar amount may be obtained. It is not a high estimate to say that at least four drops of pus can be secured from the average pyorrhea pocket during the twenty-four hours. This would be an ounce in one hundred and twenty days, or three ounces in a year. We believe it to be a conservative estimate to say that the average tooth suppurates more than ten years before it is finally removed by pyorrhea. Thus about one quart of pus would be produced for each tooth, and for all 32 teeth, about eight gallons. The disgusting part is, that all this eight gallons of pus is produced in the mouth and that most of it is swallowed. It would be of no great surprise if the production and loss of this large amount of pus should have marked harmful influence on the health and perhaps the longevity of the individual. This amazing information I have obtained from the latest work

just published by Saunders, 1915, and written by Drs. Charles C. Bass and Foster M. Johns, entitled "Alveolodental Pyorrhea."

Among the cases of ocular infection following cataract operation that I have encountered, there were seven in which I am sure that vision was lost as the result of pyorrhea alveolaris. In all of these cases (Hospital) my usual care and general attention was given; that is, the operation seemed faultless, the sterilization of instruments always the same, after dressing carefully followed, yet in spite of this care, a well marked line of infection was seen on the second day—I wish to say in passing that this infection, apparently, starts almost immediately after the incision, for it is readily discernible at the end of twenty-four hours, but it is not very active. It may be classified as a slow panophthalmitis. There is not the usual swelling of the eyelids, not much edema of the conjunctiva during any of the course of the disease. These seven cases, fortunately, did not happen in one year, but covered a period of three years. The clinical picture of one was the clinical picture of all. They were enemic, having pale yellow dry skins, faces drawn and more or less haggard—thin nostrils and sunken eyes, prominent teeth, with retracted gums and pus pockets, tongues flabby, breath foul, always dull and stupid, bowel action sluggish, urine highly colored with a pronounced fetid odor.

A recent case, female, age 42, consulted me relative to a cataract operation. The usual preliminary examinations were made, the front teeth were found to be in good condition, but around the bicuspsids and molars, the gums were retracted as the result of an excessive pyorrhea. As had been my custom for a long time I placed her on grey powders, one grain, three times daily; instead of the amount prescribed she quadrupled the dose, taking four grains three times daily. This soon brought out an active pyorrhea; although the operation was successfully performed, I found at the end of twenty-four hours, a distinct white line of infection along the line of corneal incision in the right eye. I immediately had the few teeth on that side extracted. The mercury was withdrawn, and a tincture of myrrh mouth wash was ordered. By these means, together with an injection of emetin at the base of each tooth, as well as injection of 5,000 units of antidiphtheretic serum daily for four days, and an application of a five per cent solution of trichloroacetic acid to the line of incision, the pus disappeared and good vision was obtained.

A second case gave conclusive evidence that an abscessed tooth may provoke a hypopyon. The latter patient was operated on, the cataract being removed from the left eye. No trouble followed until

the end of the eighth day, when there suddenly developed an abscess at the root of the tooth on the left side of the upper jaw. Within twenty-four hours a small amount of pus was discovered in the anterior chamber. Apparently, there was no iritis, or if any, very little. The tooth was extacted, the cavity sterilized by means of mouth wash, with the result that the hypopyon disappeared as rapidly as it had come. This is one of the extraordinary experiences one meets with during a life time. Experience is a wonderful taskmaster—"it makes us wondrous wise."

Since oral surgery has made such wonderful strides all ophthalmic surgeons read, with much profit, such works as those emanating from the pen of Bass and Johns, Gros, Flexner, Sternberg, Hecker, Allen J. Smith, Barrett, and others.

So careful have we become, that the teeth of all cataract patients are carefully examined—a cursory examination is made by myself or one of my assistants, and if in doubt, he or she is sent to a competent dental surgeon. We may replace teeth and make them useful, we may replace an eye but it is useless as an organ of vision. The Medico-Chirurgical College Dental Department is now giving didactic and clinical lectures on the treatment of pyorrhea. The number of cases treated from January 1, 1915, to January 1, 1916 was 304, out of which 95% were absolutely cured. Our ophthalmic department furnished many of these cases.

I am greatly indebted to Dr. I. N. Broomell and Dr. W. J. McKinley, of the Dental Department of the Medico-Chirurgical College for their valuable assistance in the treatment of these cases of pyorrhea alveolaris. The detail of which is, as follows: The teeth are thoroughly cleaned by scaling, then an injection at the gingival margin every day for 5 days of emetin, one-half of a one per cent solution, followed by an iodine solution (4 part iodine, 49 parts alcohol, 50 parts normal saline solution): applied to the gums and also injected to the root of the tooth, for three days. A mouth wash is used after each meal. Where we find spirochetæ neosalvarsan, 15 grammes to 6 c. c. normal salt solution, is injected at intervals.

It seems like bringing coal to Newcastle to bring my paper to you tonight, for my good friend and one of your members, Dr. Frank Allport, was one of the first to sow the seed twelve years ago in an article published April 15, 1904, on "The Relation of Odontology to Ophthalmology and Otology," which has so well covered the subject. I take the liberty of making the following quotation from Dr. Allport's paper: "Neuralgic toothache may be the prodromal signs of glaucoma but it must not be forgotten that

the same general nervous supply extends both to the tooth and the eye, not only through the medium of the fifth pair of nerves, but also through the sympathetic system, and it is therefore not difficult to see how amblyopia, amaurosis, iritis, keratitis, conjunctivitis, strabismus, cycloplegia, etc., may be produced by diseased teeth of the upper and even the lower jaw." He further states "that in all free dispensaries a dental department should be established where proper oral therapeutics might be administered and where cases could be promptly referred to and correctly treated."

It must be gratifying to know that this advice is now being carried out, not only in the dental departments of the Medico-Chirurgical College and Hospital, but in the colleges and hospitals throughout the land.

In 1903 I read a paper before the State Dental Society at Wilkes-Barre, Pa., entitled: "The Relation of Dental Affections to Diseases of the Eye." This paper was on lines laid down by Dr. Allport, and I know you will pardon me for abstracting some of that paper to refresh your memories on facts that were new then, but are pertinent today, and that the advance of oral sepsis today is proving valuable to medical science. We must feel most grateful to those earlier writers for their valuable observations and it is well to follow the trail so carefully blazed by them. Henry Powers of London (*Trans. Odont. Soc. Gr. Brit., London, 1883-4, XVI, page 56*), studied this subject in detail and found that "dental lesions were very frequently the cause of diseases of the eye." He called attention to the necessity of carefully examining the teeth in threatening glaucoma, especially when associated with ciliary neurosis and with obscure temporal and orbital pain, mydriasis, myosis, sudden paralysis of some of the orbital muscles, and loss of sensation in the absence of cerebral symptoms, phlyctenular and corneal ulcers (especially in children), sudden failure of accommodation and exophthalmia. According to his deductions the irritation produced by the diseased teeth may affect the eye by—inhibition, trophic or vasomotor influence, extension of neuritis, and reflex irritation or sympathy."

Conjunctivitis has been attributed to the teeth by Forster, Kempton and others, and relief has been induced by extraction of the offending teeth. Iritis with external inflammation of the eye of fifteen days' duration coexisting with intense dental neuralgia of the same side has been cited by Galezowski (*Jour. d'Oph. Tome I*). That affections of the eye may affect the teeth is further shown by Hutchinson (*London Med. Mirror, 1869*), in the case reported by him in which acute ulcers of the cornea from injury with hypopyon,

chemosis and pain caused the patient to complain that his eyes made his teeth and ears ache.

In this paper I made use of the following pertinent sentence: "Purulent inflammation at the roots of teeth is occasionally the cause of serious affections of the orbit, and the possibility of its occurrence should never be overlooked." At that time I was not operating on the great variety of cases that I meet today, or it may be that Riggs' disease was not so common among our hospital patients. Then if a cataract was lost, the cause was assigned to a "cold" in the eye, or some indiscretion on the part of the patient. We did not know, as Fitzgerald puts it, "that a pyorrhea in the mouth may favor the growth and development of certain pathogenic organisms, and thus render the patient more liable to contract certain infectious diseases."

In a case reported by Dr. Simeon Snell (*Oph. Review*, 1890, page 193), a sinus was formed in the left orbit which was directly associated with disease of the right upper central incisor in a girl seventeen years of age. S. M. Burnett (*Arch. Ophthalm., N. Y.*, 1885, pages 177-180), adds to the literature on this subject the report of a case of great swelling of the eyelids and face following an unsuccessful attempt to extract the upper bi-cuspid tooth on the left side. As a result, purulent infection occurred, with abscesses of the orbit, atrophy of the optic disk, obliteration of the retinal blood vessels, and total blindness four months later.

I am inclined to believe that single celled parasite called *entamoeba buccalis* in combination with the pus-producing bacteria—prepare the way for the entrance of various pus cells, especially the streptococci, and they in turn find their way to the blood or lymph channels and ultimately into the uveal tract, causing many of our cases of slow iritis, irido-cyclitis, chorio-retinitis, and vitreous opacities of that low type we frequently see in rather elderly people. A case in point—female, age 55 years, sought advice at the Medico-Chirurgical Hospital complaining of failure of vision of the left eye. On examination her vision was found to be 20/100. There was photophobia, well marked ciliary injection with pronounced keratitis punctata. In the anterior chamber lay a large mass of lymph, while the iris was discolored and showed some adhesions on dilating. In the fundus was found what appeared to be beginning choroiditis and there were some vitreous opacities. The right eye had previously been operated upon for cataract elsewhere—panophthalmitis had developed, followed by atrophy of the eyeball. An enucleation of the right eye was advised and was carried out by myself. Taking the precaution to examine the mouth

I found a marked pyorrhea alveolaris. Pus could be pressed up from the sockets of the teeth, which were very much diseased. Her general condition was below par, also. As she was entirely dependent upon her own resources for a living treatment was somewhat urgent. She was referred to the dental department of the college for radical treatment of her teeth. Accordingly every tooth was cleaned, stumps removed and emetine injected around the alveolar processes three times. A 5% solution sodi. chlor. mouth wash was used three times daily. Internally she was placed upon small doses of gray powder, and potass iodide. Liquid food prescribed, principally milk, eggs and beef tea, gradually getting back to solid food stuffs. She improved in health, gained ten pounds in two months, and I am pleased to say the inflammatory processes disappeared. The iritic adhesions were broken down with solid atropine and dionin. With the correction of sph—1.00 cyl—0.50 axis 110 her vision was 20/50. After several and more minute examinations it was found she had beginning cataract. This is the type of cases we are liable to meet almost daily, where the retina and uveal tract are involved.

To you who are interested in the evolution of this subject I must call your attention to that interesting address delivered at the Oxford Ophthalmological Congress, July, 1914, by Mr. W. M. Beaumont on "The Evolution of Toxaemic Iritis." He writes: "It is I think agreed that pyorrhea alveolaris is the most frequent source of toxaemic iritis, and the reasons would seem to be, first, the great prevalence of pyorrhea, and second, that the infection in these cases is direct into the circulation, whereas, in many other forms of alimentary toxæmia the toxins have to undergo the ordeal of the hepatic furnace. No iritis is primary, always infection."

While Dr. Beaumont does not touch on the surgical side of this question yet to me his train of thought proves conclusively that an injury to an eye under conditions as he described, and quotes from other writers, would certainly lead to suppuration.

In the year 1913 a renowned discussion was held on alimentary toxæmia before the Royal Society of Medicine, in London. Among that illustrious group of physicians and surgeons I must quote Lawford and Lang. Lawford says, "For the purpose of this discussion it is convenient to divide the alimentary canal into two parts: (1) the mouth and fauces, (2) the gastro-intestinal tract. That toxæmia may and does result from septic condition of the mouth, especially that due to chronic gingivitis and pyorrhea alveolaris, no longer admits of any doubt. The relation of oral sepsis to diseases of the eye has received very close attention in re-

cent years. For obvious reasons the observations upon eye diseases attributed to *oral sepsis* are more numerous and more convincing than those in which *intestinal toraemia* is assured to be the cause. The association of pyorrhea alveolaris and chronic irido-cyclitis is well known to all ophthalmic surgeons. Credit is due to Mr. William Lang for being one of the first to recognize the significance of this association.

Mr. Lang, who followed in the discussion presenting valuable and interesting data, at the same time giving the following table:

Table I.—The source and number of the cases attributed to sepsis.

Lacrimal sac	1
Antrum of Highmore.....	1
Nasal inflammation	2*
Inflamed tonsils	3
Pyorrhea	139
"Indigestion"	2
Appendicitis	3
Large gut infection including colitis and the like.....	33
Kidney and bladder	4
Male urethra	20
Uterus and appendages.....	3
Skin diseases	4

Total 215

Table Ia.—The number of times that the different parts of the eye were infected in the 215 septic cases of Table I.

Sclerotic	20
Cornea	12
Iris	87
Ciliary	79
Choroid	68
Retina	28
Detached retina	3
Optic neuritis or atrophy.....	4
Lens (secondary cataract).....	14

Table II.—The cause to which the other cases were attributed and their numbers:

Syphilis, congenital	40
Syphilis, acquired	35
Tubercle	27
Albuminuria	24
Gout	23
Diabetes	12
Following acute fevers	7

Total 168

Table IIa.—The frequency with which the different parts of the eye were affected by the diseases in Table II.

Sclerotic	24
Cornea	47
Iris	25
Ciliary body	4
Choroid	35
Retina	36
Optic neuritis or atrophy.....	12
Lens (secondary cataract).....	1

And Mr. Lang further states: "It seems incomprehensible that a surgeon whose single aim is to avoid sepsis in his operations, can think it a matter of no importance that a person should have a chronic source of sepsis in any part of his body." With especial emphasis Mr. Lang states:

"The usual objection made is that one sees very bad cases of pyorrhea in people who say they are enjoying the best of health and who do not complain. These objectors seem to forget that Nature begins to raise a protecting barrier the very minute the tissues are irritated by bacterial toxins or are invaded by the bacteria themselves. If the invasion is slow enough, as is the case in

pyorrhea, the barrier is efficient and the individual does not appear to suffer; whereas when the micro-organisms are introduced direct into the circulation there is no time for the efficient barrier to be raised. As long as the patient is in fair health the barrier is capable of doing its work; but this barrier may give way directly the general resistance of the tissues is lowered under the strain produced by some other illness or by traumatism, either surgical or accidental. Then the organisms or any excess of their toxins, will be able to pass through the defending barriers and some tissue in the body may become the seat of disease.

"I wish to draw especial attention to the baneful influence that a chronic septic focus frequently exerts upon eyes that have recently been operated upon. The eye often becomes acutely inflamed and remains red for a much longer period than the severity of the operation would warrant, but rapidly quiets down when the exciting cause has been removed"—this has also been my experience.

I have come to the part of my subject which I consider the most important. What are we to do with our cataract, glaucoma or chronic iritis cases, when we must perform an operation, especially where the iris is complicated?

First—Preliminary Treatment—In ordinary cases we have given for many years, grey powder (mercury and chalk) grain 1 to 2 grains, three times daily, for a week prior to the operation. In addition to this a simple saline eye wash to flush the conjunctiva. The meat diet is cut off, and the vegetable one increased. The best personal hygienic care that is compatible with the surroundings of the patient, is advised. Where there exists the least suspicion of any catarrhal trouble of the nose he is sent to the rhinologist. If the conjunctiva shows any catarrhal tendencies a specimen is sent to the bacteriologist for examination. If all is satisfactory we can proceed with the operation and count on good results.

Second—Where pyorrhea alveolaris exists the modern ophthalmic surgeon begins his treatment by referring such cases to the up-to-date dentist, who immediately inaugurates his course of treatment. When the patient is referred back to us as cured, the patient is placed on a good tonic for four or six weeks, adding iron arsenic or iodides to try to eliminate all toxins that might still lurk in the system. Yet we are not satisfied, but twenty-four hours before the operation 5,000 units of diphtheritic antitoxin serum (Mulford's) is injected sub-cutaneously, and if there is the least suspicion of infection after the operation, this latter treatment is repeated for, at least, four days. All this may seem heroic, but let

me assure you that we are dealing with an enemy not to be trifled with, and experience gained in following out this line of defence in septic wounds of the eye, has caused me to adopt this method of prophylaxis, and with much success in pyorrhea cases.

It is obvious from data I have collected as well as from my personal experience, that we are not only dependent upon our oral surgeons for help, but we must bring in the internist as well for special medication to help us eradicate that toxæmic condition which provokes such disastrous results in the surgical operations on the eye.

A NEW METHOD OF DRESSING EYES AFTER CATARACT EXTRACTION.

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CALCUTTA.

The methods of dressing eyes after cataract extraction are very numerous. Hjört, of Christiania, left the eyes open without any dressing and got good results. Given amenable patients and good nurses this is a very satisfactory mode of treatment, though unless the patient's hands are controlled during sleep damage may be done by them. The slight movements of the lids are useful in helping the flow of tears and lessening the accumulation of secretions and the growth of micro-organisms. For hospital patients however some protection is required. With sensible patients a double gauze screen—one of Bronner's soft gauze screens, not the hard wire ones, is best, protects the eye, and allows opening and closing of the lids; in fact it is the same as Hjört's open treatment only the eyes are protected from external injury. Even this amount of liberty is apt to be abused, however, and some protective dressing is, in the majority of cases, absolutely necessary. The ordinary circles of sterilized wet or dry lint or gauze covered by dry woollen pads, lead to pressure over the most prominent part of the globe and in flap operations this leads to some displacement of the wound edges as is well known and has often been described. Packing the orbit all round the eye with dry wool is difficult to carry out so as to result in even pressure. In order to produce an even pressure over the front of the eyeball I have for some months now used swabs of wet sterilized wool applied as follows. Wool pulled, not cut, into pads about an inch thick and the size of the dry wool pads usually used, three inches in diameter, are sterilized by boiling in 1 in 5,000 biniodide solution. After the completion of the operation 2 of these sopping wet, not squeezed out, are laid upon the two eyes. With the straightened fingers they are gently pressed down over the eyes, the surplus liquid running down each side of the face where it is caught by towels and prevented from entering the ears or wetting the clothing and bedding. If the index and little fingers are pressed down rather more firmly than the second and third fingers the swab becomes moulded to the eye more evenly. If the swab is raised up it will be found to have become moulded to the eye and to fill in the hollows round it. Over this swab is placed a wet pad consisting of lint on six layers of

gauze and then a figure of 8 bandage is applied fairly firmly. On opening the dressing next day the wool gauze will be found dry and forming a complete mould of the eyeball and orbital opening. Experimenting on myself I found that whereas the ordinary wet gauze pad applied first and covered with dry wool and bandaged in the same way produced a slight feeling of pressure on the eye and interfered with the movements of the globe, this wet moulding method is very comfortable and produces no feeling of uneven pressure while it allows the eye to move easily. For, of course, no method can stop movements of the globe. Moreover with these wet wool pads, it is almost impossible to open the eye lids under them whereas with gauze and wool pads the lids can be opened slightly and then stick open and can not be closed again. This is very uncomfortable—leading no doubts to patients making efforts to readjust their dressings and sometimes to damage of the eye if not to infection from dirty fingers.

It should be mentioned that not all absorbent wool makes good swabs. With the best wool, absolutely free from all grease, the pads run together after boiling. With a rather lower quality of wool they remain separate and are more easily taken out of the bowl in which they are boiled and applied full of liquid.

I was led to try these wet wool moulds, as they might be called, by way of an attempt to reduce the percentage of prolapsed iris after simple extractions. The results of the operations preformed since using them are decidedly in their favor. Of 629 extractions performed, 328 have been combined (i. e., *with* iridectomy), and 301 simple (i. e., *without* iridectomy). In the combined extractions there were 6 prolapses of iris=1.13 p. c. If the simple extractions there were 14 prolapses=4.65 p. c. Of these 301 simple extractions 109 were dressed with the usual wet gauze pads covered by dry wool and there were 9 prolapses=8.25 p. c. 192 of them were dressed with the wet wool moulds and only 5 had prolapses of iris=2.60 p. c. If this reduction of prolapses from 8.25 p. c. to 2.60 p. c. is maintained in further comparative series the advantage of the method would be established. Most of my cases are now dressed with them and the results have led to my performing a considerably larger proportion of simple extractions than formerly, when iris prolapse occurred often enough to deter one from doing them except in specially selected patients.

The advantages of these wet moulds may be said to be (1) good protection to the eye and firm support to all parts of the front of the eye—this leads to quicker healing, less chance of infection, greater comfort and possibly less astigmatism from less interfer-

ence with the position of the flap; while of course the more comfortable the patient is the less likely he is to try and open his dressing. (2) Decreased number of prolapses of iris.

GAS-OXYGEN ANALGESIA IN EYE, EAR, NOSE AND THROAT SURGERY.*

WILL WALTER, M. D.

In the beginning it is proper to disclaim all effort to discuss the subject of deep general anesthesia. That field belongs properly to the anesthetist.

Our theme relates to the means and the technique employed in the production of analgesia, a newer type of painless surgery, and particularly to what might be called the minor cases, though applicable to many cases hitherto thought to be of major type. These are as related to the cases requiring a special anesthetist in the proportion of about ten to one. They are the cases in office and bed-side practice for which we ourselves should provide painless surgery, both with the idea of saving of time, of effort for ourselves and of expense for them; most of all, however, we aim to take from our patients the distress incident to minor surgery and that which accompanies more profound anesthesia in major work; also to eliminate the fear and shock elements.

Interest in gas-oxygen analgesia is at once aroused by personal experience. One who intends to use it in practice should first try it on himself. As consciousness or at least semi-consciousness is maintained, though pain sensation is dulled or annulled, self experimentation is easy.

My first experience was a personal one, and my sensations were, I should say, subconsciously though not consciously painful. To use a paradox the operation hurt though I did not feel it.

To those who are unfamiliar with the subject, may we call to mind that analgesia differs from anesthesia in respect to this consciousness or semi-consciousness and the voluntary control which accompanies the former; in fact, I should say from experience that this condition is a border-line one since the patients are quite amenable to suggestion though they may be unable to answer questions.

Nitrous oxide alone, as you have many times seen, produces cyanosis with anesthesia, an undesirable state; a small amount of oxygen added, two or three per cent, will, however, prevent this cyanosis though still allowing complete anesthesia. A further dilution of the gas with oxygen, will produce various stages of analgesia and not anesthesia in the sense of complete loss of consciousness and voluntary control, and the ratio required for this

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analgesia varies from ten to thirty-three per cent or even fifty per cent of oxygen, according to the degree of analgesia needed. This is governed of course by the varying susceptibility of the patients as in any form of anesthesia. Also a lower ratio of gas to oxygen will produce either analgesia or anesthesia when preliminary medication, as by morphine or scopolamin, is employed or when the patient is nervously quiet—mentally relaxed—and free from fear.

That successful gas-oxygen anesthesia depends upon the exclusion of air will be evident upon study. Nitrous oxide alone will produce anesthesia but that anesthesia is, as we have noted, accompanied by cyanosis and may not safely be continued for any length of time, but with the addition of two or three per cent oxygen the anesthesia is still perfect and may be continued indefinitely.

Now it will be seen that an admixture of air, which would give this two or three per cent of oxygen, would dilute the volume of nitrous oxide to an extent lower than would produce anesthesia. Air contains twenty volumes of oxygen and approximately eighty volumes of nitrogen, therefore, to add two or three per cent of oxygen in air would require an admixture of eight to twelve per cent of nitrogen and this would immediately reduce the ratio of oxygen to nitrous oxide. The greater the amount of air employed the less the available nitrous oxide.

In dentistry it is possible to employ any ratio of oxygen to nitrous oxide through the medium of a tight fitting nose mask and to continue its administration for analgesia indefinitely, because the patient is able to obstruct his mouth breathing by means of the tongue without interference with operation upon the teeth. The application here simulates general gas-oxygen analgesia and is the same as for all operations with which we are concerned, with the exception of work beyond the wall voluntarily brought about by the apposition of the soft palate, the tongue and the anterior pillars. Therefore our problems are the same as other problems with reference to this type of anesthesia so long as air may be excluded from respiration. But for surgery of regions behind this wall we are obliged to produce an anesthesia and to work rapidly as soon as this wall is opened and air of necessity inhaled.

As to how we endeavor to meet this will be seen later, for while we may not produce anesthesia with the mouth open we may produce a degree of analgesia if we throw into the mouth a stream of pure nitrous oxide sufficient to minimize the amount of air in the mixture, producing a fairly good proportion for the production of analgesia.

MASK MUST BE TIGHT.

Bearing in mind, therefore, that if we wish to control analgesia we must exclude air, *the first requirement* of an apparatus for the administration of these gases will be at once apparent: viz. that the mask be tight. It has taken us something like two years to find a tight and universal mask adapted to this work and it is with a sense of pride that we show you this part of the apparatus. There are three sizes of this mask, the principle in all being the same, one for adults, one for children—both for the complete face—and one for the nose alone, this latter being adaptable to practically all cases. Each mask is made in a single piece of rubber with a feather edge. No adjustments are necessary, they simply fit themselves to any face.

APPARATUS MUST BE FREE FROM PRESSURE.

The second requisite of the apparatus is that it should be free from dangerous pressure. We are dealing with a pressure of gases in gas and oxygen tanks from 1,500 to 800 pounds and the problem here is to reduce it to a safe and constant pressure and then to control it at that pressure and keep it within safe limits, so that there shall be no possibility of high pressure gases entering the lungs.

RATIOS OF GAS AND OXYGEN MUST BE CONTROLLED.

The third problem is to have a definite measure of the ratio of oxygen added and this must be met not by any theoretical scheme of regulation, as by the amount that a valve is turned, but by some visible evidence of the rate of flow—an actual sight feed proposition.

GASES MUST BE WARMED, MOISTENED AND WASHED.

The fourth problem presented relates to the washing, warming and humidity of the gases. I know that these things have not been thought of great importance, but if we are working for refinements they are necessary and certainly are a great aid in their application for the production of anesthesia and analgesia. Nitrous oxide is a desiccating gas and after prolonged use will produce certain drying of the pulmonary tissues, hence the addition of humidity is of value. Both gases are occasionally impure, containing oxidizing products and flakes of rust and as we have no control over their delivery to us and as, in spite of the greatest precautions, these impurities are sometimes introduced, the washing of the gases by passing through water is of great advantage. As to the warming you will not have to be told that a warm gas is more absorbable and will go farther than a cold one and that hence their washing and warming and the addition of humidity to about fifty

per cent or more should have a prominent place in such an apparatus.

PATIENT MUST CO-OPERATE.

The fifth problem for analgesia is the enlistment of the aid of the patient. If we are to produce ideal analgesia there must be a willingness on the part of the patient to help. This they are very willing to do when the problems are explained to them and the great advantages of the method are shown. Suggestion and counsel and the quieting influence of the anesthetist are here most apparent just as in most methods of anesthesia. The patient needs to be assured repeatedly that everything is all right and to be told with firmness what to do. In analgesia they will hear you and will do what you say though they are not usually able to answer questions. It is this state which seems to offer so much help for us in daily routine.

Obviously in hospital service our patient is turned to us ready for operation and without any thought on our part as to the means employed. But the whole world wants to be free from pain in surgery and most of them want to hold to consciousness and dread the loss of it by being put under beyond the possibility of immediate recall. Incidentally, laymen are in full knowledge these days of the annoying after effects and the dangerous shock sequelae of complete narcosis. Then there is the time element, the element of preparation necessary for ether narcosis and lastly the overcrowding of hospitals for minor work and the longer detention for these short cases because of the heavy anesthesia.

Any degree of analgesia up to complete anesthesia may be brought about with absolute safety and without previous starvation or preparation, in two or eight minutes.

During the past two years this apparatus in various stages of evolution has been in daily use and has found application in the following cases with relief from the distressing pain usually accompanying them.

IN OFFICE PRACTICE:

In Ophthalmology—Opening of lid abscesses, operations upon cysts, styes and small tumors. Electrolysis, painful epilations, cauterization of ulcers. Removal of stitches, removal of deep foreign bodies. Passing of lacrimal probes, slitting of canthi, expression of trachoma bodies. Repairs of traumatism. Sewing up of lacerations, and painful applications and examinations generally. It is available for most operations upon the lid and I once used it for Ziegler's cautery operation for entropion. All of these op-

erations may be done in office practice and to the great relief of patients.

In Rhinology—Incision of furuncles. Opening and curetting of abscesses and of ethmoidal cells and any painful intra-nasal work; puncture and drainage of antra, removal of polyps, post-turbinal hypertrophies, cauterizations, removal of stitches from frontal sinus operations and the passing of probes in these cases. All these operations are done using the mouthpiece and inhaler. Adenoidectomy and tonsillectomy have frequently been done in the office, employing this method. Peritonsillar abscesses are easily cared for and the patients' control over their expectoration is of great value.

In Otology—Incision of furuncles, painful probings, removal of stitches, removal of polyps, curettage of granulations, all painful dressings and applications and examinations. It is particularly valuable in paracentesis and for ossiclectomies. In first dressings after mastoid it is wonderfully comforting.

In Hospital Work.

It is available as a preliminary to general anesthesia, and complete anesthesia may be brought about as we have shown either by the gas-oxygen alone or by the addition of ether, and in the latter case they slip into the general anesthesia quite unconsciously. They will usually recover before the dressings are applied even when relaxing portions of ether are added as they may be without removal of the mask.

Alone I have on two occasions filled the bag with gas-oxygen in proportion of ninety to ten, detached it from the apparatus, letting the patient control it, rebreathing the mixture and deepening the respirations at the critical moment and have been able to make otherwise unbearable short operations painless. Once we removed a tonsil by this means without assistance, the patient inhaling until she dropped the bag upon which I removed the tonsil and was making pressure upon the area when she came out.

Several times we have taken a bag full of the gas with three per cent oxygen to the house of the patient as a preliminary for ether to be administered by the family physician. This practice would be easy also for a bedside paracentesis when it is inconvenient to take along the whole apparatus. This bag filled and put into the satchel may be easily carried and will instantly be available for use.

MUST EMPLOY REBREATHING.

The sixth problem is that of rebreathing and as it is more than likely that many of the good effects of gas-oxygen anesthesia depend upon rebreathing, its solution is important. It is here met

by putting the bag at the mask and by controlling absolutely and in a simple way the to and fro or partial or complete rebreathing desired.

ETHER ADDED WITHOUT REMOVING MASK.

In cases requiring anesthesia ether may be added without the removal of the mask and without stopping the flow of gas-oxygen. Full description of this technique is published elsewhere. *This constitutes the seventh problem* and relates more to anesthesia than to analgesia and hence is omitted from the discussion.

Incidentally, once the patient is under ether the ether is retained in the blood by means of rebreathing since ether will be retained after the ether tension in the bag and in the blood are equal; thus less ether is needed to bring about narcosis. Then by



Fig. 1. Showing Full Face Mask. Ether Cylinder Attached.

finishing with gas-oxygen, using to and fro breathing, the tension being lowered in the bag, ether is quickly eliminated and the post-operative elimination rendered unnecessary, ensuring quick recovery and freedom from after effects.

The means by which the above mentioned problems have been met have been elsewhere described in detail, as well as the technique of application. The latter we will rehearse briefly.

TECHNIQUE OF APPLICATION.

The apparatus is made complete and there remains nothing to do but attach the gas tanks. When used away from hospital or office we order the tanks delivered direct from the dealer and have to carry only the apparatus in its case together with the mask and attachments.

The tanks are attached, after which warm water is poured in up to the marked water line. The hydrostatic safety valve is always open at the top and if water is poured through this opening it first fills the safety valve and then overflows into the mixing chamber.

For operations of twenty minutes' duration or less we depend upon the water for the heating, but for longer cases we attach the plug of the heating coil to a convenient socket.

Both needle valves are now closed and the outflow valves on the tanks are fully opened, also the one hand control valve. The pressure of gases is now at the needle valves and ready for the determination of its flow by opening these valves. The Nitrous

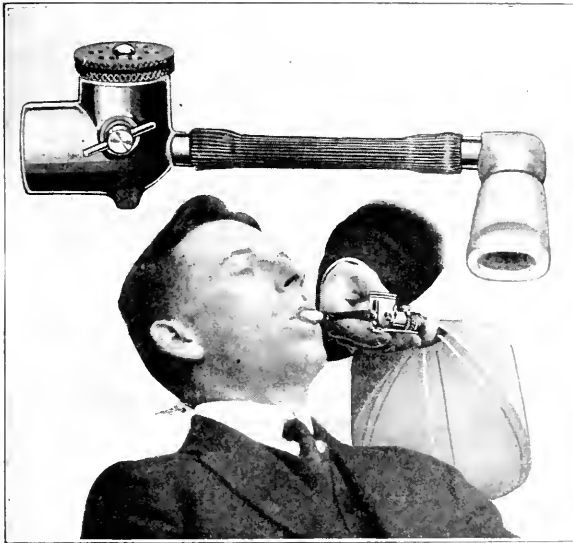


Fig. 2. Showing Mouth Inhaler, for Nose or Eye Surgery.
Ether Cylinder Not Attached.

Oxide needle valve is first opened to the required flow and the level is noted, after which the oxygen needle valve is set at the desired percentage. The control valve is now closed and we are ready.

The proper mask is applied to the patient, mouth piece if for nose operation, nose mask if for mouth operation and the whole face mask if for general work.

The control valve is now opened and the breathing bag allowed to fill with the mixture of gases. This is accomplished by closing the outlet valve of the mask. The outlet valve is then opened allowing to and fro breathing and the patient is directed to inhale and is allowed to until he fails to answer questions,—he is in the

by what is very good, a Foregger mouth piece. The direct flow is instituted and sufficient gas is forced into the now open mouth to maintain analgesia.

The patient is able to expectorate blood if the tubes are employed rather than the gag, but it is necessary to start with gag in place since many patients shut the mouth tightly when passing into anesthesia and time is lost in forcing it open. It is difficult to voluntarily expel blood from the mouth with a gag in situ. Analgesia allows the patient to voluntarily expectorate and they will do so when bidden.

When employing analgesia we usually take one tonsil, allowing time for stemming hemorrhage on that side before doing the other, but it is sometimes easier to free both pillars under local anesthesia and then while in the analgesic state to do both excisions before they recover.*

For endolaryngeal work the continuous flow may be employed and as it is most important here to have warmed, washed and humid gases, and low pressure, we may temporarily stop off the safety valve and thus forcibly expel the gases from the bag in any quantity or by pass flow of the gas directly. The technique of Gwathmey-Woolsey is excellent for these cases.

For adenoidectomy a simple administration of gas-oxygen is all sufficient, as the operation may be done before the patient comes out of the analgesia.

The thought is prevalent that little children cannot take gas-oxygen because they have not sufficient respiratory power, but with this lower pressure apparatus and its safety attachment no trouble has been experienced. Often the child will struggle, but he will not afterwards remember that he has been subjected to traumatism.

Recovery from analgesia is a matter of two or three minutes and no untoward effects have been observed.

*Our most successful routine in tonsillectomy is: First, preliminary hypodermic of morphine and atropin one hour before operation, dose according to age; surface anaesthesia with cocaine and adrenalin; three injections of 2 per cent novocaine and adrenalin on each side, one under the mucosa of the anterior and posterior pillars, the third in the capsule of the tonsil, the needle being introduced deeply above the tonsil. The patient is in the upright position and the tonsil is freed by sharp or blunt dissection as needed, the tonsil being held on the stretch. If the patient is nervous or hyperaesthetic or is complaining we then do the same to the opposite tonsil, after which analgesia is given and both tonsils removed by snare. If the patient is not complaining gas is not used, operation being concluded upon the first side before the second is dissected. If the Sluder is done, both tonsils are taken with one analgesia if possible; more often one is taken out at a time, the second after bleeding in the first is checked.

Note—The apparatus is distributed by The Safety Anaesthesia Apparatus Concern, 1422 Bryan place, Chicago.

DISCUSSION.

DR. J. M. INGERSOLL, Cleveland: At Lakeside Hospital, nearly all the surgical staff use gas anaesthesia exclusively. We have our own plant and it is piped to the operating room. In my own work I begin with gas anaesthesia. Where we are not working directly through the mouth, many of the patients are continued under gas anaesthesia. I say anaesthesia because I had an idea I could not say anything about analgesia. But we use gas anaesthesia in the majority of work, —mastoids, etc. Gas and oxygen. The use of it as an analgesic in the minor operations is something we do right along. For the incision in the drum membrane or opening furuncles in the auditory canal or nose. For all operations where you intend to give ether, gas is a desirable adjunct, which shortens the period, decreases the element of shock, decreases the amount of ether which must be given at all. I would feel lost without it. With oxygen ready at any time you can have plenty of oxygen. We give oxygen at the end of the operation to hurry their recovery.

Personally I have no experience in giving gas. We have our trained anaesthetists. I depend absolutely upon them. In a mastoid operation, if the blood gets a little dark, I say, "It is getting darker." She gives a little less gas and a little more oxygen. I say they are trained. Most of them have training in our dispensaries during tonsilectomies. They get a very fair training there, as it is one of the most difficult anaesthetics to give. My own experience in giving it is absolutely nil. In Lakeside, we feel that gas is the safest anaesthetic we have, with skilled anaesthetists. I emphasize the word "skilled." A well trained, skilled anaesthetist can give gas more safely than any other anaesthetic. The element of risk in untrained anaesthetists is greater with gas than with ether. The margin of safety is wider with ether than with gas. I should hate very much to do a mastoid operation under gas unless I knew absolutely that my anaesthetist was a skilled one. I have experimented a little in doing tonsilectomies with gas alone, blowing the gas directly into the mouth in large amounts with the mouth closed. I found in giving gas enough to keep them we had to blow so hard it would blow the blood around and be disagreeable. I think it requires muscular relaxation, and you cannot get it with gas as easily as with ether. We have an ether tube attached to our gas apparatus, and the tube is put into the mouth when we begin the tonsilectomy and the ether blown in gently. I have experimented in putting the tube into the nose, but it is still an experiment. We still do not like it as well as the relaxation you get with ether. It may work out more successfully. Children we start the same as an adult. We begin with gas anaesthesia and then switch to ether or continue with the gas. We do not make any difference in regard to the age in the choice of an anaesthetic.

DR. MOWER, of Marion: I use it for all forms of operations and I think we have overlooked something very important in the hands of those who know how to use it. The doctor has just told us that in the hands of the inexperienced it is dangerous. You take a lot of adults who do not want you to use cocaine, if you use your gas for pressure, and train them by suggestion you can do the tonsil opera-

tion painlessly. You can dissect your pillars, etc., and if you train them your patients will talk to you and get up and walk away in two minutes. In the removal of foreign bodies, it is a pleasure to have the patient hold the mask and get just as much gas as is necessary to remove the foreign body. Dr. Crile, of Cleveland, does all his operations, I think, with gas. It should not be limited to eye work, but nose and throat as well. Patient should be held forward in tonsil work. It is absolutely painless and the patient knows what you are doing.

DR. CAYCE: I do not wish to say anything against the gas operation, but it requires so much skill. In our hospital we have a gas apparatus out of order, and they say it won't work. When a man can do 20 to 23 tonsillectomies in the morning under ether, I can't see any reason for the use of gas. One man can operate and have four or five anaesthetists and there is no use for gas. We have a very expensive apparatus there, but always resort to ether. When we get down to it we go back to ether. It is safest, after all.

DR. BRODRICK: I have had some experience in the past seven years in the use of gas and gas-oxygen anaesthesia and analgesia for about four years. The presentation by Dr. Walter is especially interesting in bringing the portable apparatus and one that can be manipulated by the patient. I have used gas almost exclusively for seven years, and have had experience with the McKesson apparatus and some home-made affairs, but to Dr. Walters in this way we owe a great deal. I have used gas and oxygen as an analgesic. I have done a good portion of the nasal operations, especial sub-mucous. In the case of a very nervous woman it is always a hard problem. Gas can be given to an analgesic state and it relieves the terror of the patient. I am glad Dr. Ingersoll mentioned the importance of a trained anaesthetist. So many times have I seen gas given by so-called experts where they get the patient into a state of anaesthesia and then force the gas. A great many of the criticisms I have heard from men who have been prejudiced against gas have been due to that. The instrument maker is to blame for having produced a complicated apparatus and talking about percentages. The percentage of oxygen has nothing to do with it in an individual case. Every case is a law into itself in giving gas in an analgesic state. One man will take pure nitrous oxide and another pure oxygen.

DR. SAMUEL IGLAUER, of Cincinnati: I have had a good deal of experience with gas and ether, and 12 years ago presented a paper on that subject and devised an inhaler for the use of gas and ether, and it is used attached directly to the ether bag. I think this is an important field. The dentists and obstetricians have shown us the way here. It will probably supersede the twilight sleep. While this complicated apparatus is valuable for prolonged administration, for ordinary office work you do not need anything but a tube of gas and a piece of rubber tubing, a bag and a face mask. You do not require a trained anaesthetist to give gas for a minute or two. The dentist extracts teeth in a minute and a half, and does not need more than the apparatus I have described. There is no doubt gas is the safest

anaesthetic we have. Compared with ethel chloride there is no choice whatever. Gas is so much safer that it should be used in preference for making painful operations.

DR. DWIGHT, of Madison: The main thing I rely on is the appearance of the patient, or what he does in getting into the analgesic state. The patient does not have to get to the state of becoming black, but the sign I use is that the patient begins to be slightly uneasy. The slight movement is the first stage of the analgesic state. I rather believe if the doctor will use gas as a preliminary on his ether cases he might do perhaps 35 an hour instead of 20.

DR. DONOVAN, of Butte: A couple of years ago a young man brought out a complicated apparatus for the use of gas to Butte, and it was a complete failure. I saw him use it on five cases and could not get one of them under the anaesthetic. Our altitude is about a mile, barometer reading 24, and the use of gas is a complete failure.

DR. SHURLEY, of Detroit: Dr. Walter is to be congratulated on the refinement of the method he has given us in getting analgesia with nitrous oxide. I have made use of gas by means of the various instruments brought out from time to time. Through the early stage, where a great deal of minor work was done under gas anaesthesia, and we opened a number of peritonsillar abscesses by this method at the house or hospital or office, and I met with a tragic experience some years ago. Gas was administered by one of our internes, a well trained man, while I opened a peritonsillar abscess in the throat of a colleague and dear friend. At the moment the knife was inserted the patient stopped breathing and turned black and it was only after the most heroic measures that patient was brought back to life. A tragic experience of that kind wrecks one's enthusiasm, and I have joined the ranks of those who are exceedingly wary in the use of gas. I find it requires skill, refinement and education of a specialist who devotes all his time to that sort of work if I am to do the work I wish to do, and I want to have every confidence in the anaesthetic at work. Since then I use gas with my expert office assistant only in a paracentesis of the ear, and leave it out for throat work. Ether is the best for the rank and file of the profession, and I have, with my friend here, been able to do 25 operations in an hour with ether as the anaesthetic.

DR. BECK: I have had no sad experience with gas, but my experience has been limited. A good many years since I tried gas. I believe I was the first in Chicago to use gas to do the sinus thrombosis and gas for complete anaesthesia. I gave it up for a reason not stated here, and probably the reason the apparatus is out of order in Omaha. It costs too much. No hospital is going to give it to you for 25 tonsilectomies. That is one of the important points. Another thing, the American Medical Association has a committee on anaesthetics, that

*A word about Dr. Shurley's case: full anesthesia being brought about by gas would seem to me to be the cause of his trouble. The great advantage of analgesia is that the patient is sufficiently conscious that they do not choke, and it is just this we are endeavoring to meet, by the analgetic mixture of gas and oxygen. I do not believe that such an accident would happen with analgesia.

says gas is an unsafe anaesthetic except in the hands of experts. Analgesia, the subject for discussion, is a very excellent thing as brought out by Dr. Walter. Analgesia is the thing we are to talk about. To take away the mind of the patient before he gets the choking effect of the ether. We start him on gas and gradually float him to the ether, and we finish the operation under gas, and he is out of the anaesthetic when ready to put to bed. Then it is to be used in case of counter indication for the use of ether. Ether is the safest thing. I can see no reason one needs an expert for the use of a few whiffs of gas. It is the long continued use of gas that is dangerous. We are going to see this demonstrated next Thursday—not 25 cases but one or two.

Dr. Will Walter. Closing discussion. It was with the idea of eliminating many of the points of danger which have been raised in the discussion that we have worked out this apparatus. It is not entirely mine. We had to have an expert to get rid of the bad effects of pressure and I am indebted to my friend, Mr. M. F. Ewen, an engineer specializing on gas pressure for valuable aid.

In this apparatus you have pressure limited to a minimum of 6 oz. by a simple hydrostatic device—a column of water. By adding to the height of the column you may add to the pressure allowed.

As to the safety of gas, Dr. Hasbrook, a dentist in New York, has given it in over two hundred thousand cases for extraction of teeth, without a casualty. His patients are blue, and even that is safe for a minute or two—not longer. By adding definite percentages of oxygen, prolonged administration is made safe.

The object of going to the trouble to perfect such an apparatus was to reduce the expense of administration,—to simplify the apparatus, make it light and portable and make it safe.

It is the most economical apparatus of which I know. There are simply two small tubes in water carrying gas. We reduce all elements of pressure and the element of expense is cut down.

I had no intention of discussing full anaesthesia. I have not experience in prolonged administration myself. When employed it is by a professional.

One point I would like to dwell upon is the value of the rebreathing mask at the face; and this both for economy and safety. Three feet away it is not valuable.

When ether is added to gas give your ether in small quantities. Then if you shut off the inhalation valve and thus stop direct ether the patient may rebreathe three or four minutes, for the ether is retained in the blood so long as the tension of the blood and the bag are the same. You can control it to any degree you desire.*

Dr. Beck speaks of finishing with gas oxygen. Now we finish with the gas oxygen for a definite reason, and that is not simply to ease off the patient. As we have said, ether is retained in the blood so long as the tension is as great in the bag as it is in the blood. When you change to gas, the ether tension in the bag is reduced and the elimination of ether takes place. By finishing with gas oxygen, therefore you not only maintain the anesthesia but slowly eliminate the

previously absorbed ether. Thus the patient comes out of the anaesthesia with less ether in the blood.

The giving of full ether for tonsilectomy is in favor of the operator entirely. Those 25 operations were not easy for the patient. We should consider their post-operative condition.

Some of you do part of your tonsilectomies under local anaesthesia. The great value of analgesia added to local anaesthesia is that if in any case you get to a point where you need some general dulling you have under analgesia two or three minutes for the purpose and the patient is still conscious. When the patient gets restless or nervous then, or is having pain, you have them breathe deeply and finish the work.

In analgesia there is not the danger which exists in anaesthesia. A great many dentists are using it all over the city and many times a day, without thought of evil effect.

The patient simply holds this nose mask over the nose and breathes; in depth according to requirements.

They will afterward tell you they felt it but that it did not hurt.

122 South Michigan Avenue.

MULTIPLE WOUNDS OF THE EYE DUE TO A BROKEN SPECTACLE LENS.

A Golf-Ball Accident.

ALFRED MURRAY, M. D.,

CHICAGO.

As a contribution to the constantly increasing literature on this interesting and important subject, the author desires to report the following case:

On October 30, 1914, the patient, C. J. S., a young man of 32 years of age, attempted to knock a golf-ball over a water pipe, which was lying near the ground; the ball rebounded, striking his left spectacle lens, shattering it completely. His correction at the time was O. U.—2.50 sph.—0.50 cylinder axis 180, ground in large toric lenses. The patient stated that his vision with these lenses had always been very good in both eyes.

Upon inspection at the hospital, about one-half hour after the accident, the following injuries were found: Numerous cuts on the left upper lid, none of them, however, perforating; a deep, slanting cut in the sclera 5 mm. long, just short of perforation, situated about 4 mm. from the nasal limbus; a ragged, perforating wound of the cornea, 5 mm. long, 2 mm. in from the nasal limbus, and lying nearly parallel with it; extensive iris prolapse; an accompanying perforation of the lens capsule, with localized clouding of the lens (this subsequently developed into complete traumatic cataract). Near the center of the cornea, the epithelium appeared to be raised, but no special attention was paid to it at the time, owing to the much more urgent conditions elsewhere.

The prolapsed iris was immediately abscised; in a day or two the eye became very quiet, with completely restored anterior chamber, and well placed iris stumps.

On November 7, 1914, eight days after the accident, the irregularity in the epithelium in the central area of the cornea still persisted. Upon close examination with oblique illumination and the binocular loupe, the author was astonished to find embedded in the cornea, just below the center, flush with the surface, a piece of glass, which later proved to measure approximate 1x1x2 millimeters. This good-sized piece of glass had been in situ for eight days, without having produced the slightest symptoms on the part of the eye, or without having caused the patient the slightest discomfort. In the meantime, the lens had become totally cataractous, large flocculent masses almost filling the anterior chamber. An

attempt was made to remove the piece of glass with a spud. It evidently had completely penetrated the corneal substance, and very slight pressure on it caused it to prolapse into the anterior chamber, where it rested in the flocculent lens matter; the anterior chamber immediately collapsed. Its new position inside of the eye was determined by means of the loupe and oblique illumination. The author inserted a small keratome at the lower limbus, and succeeded in raising the piece of glass up to the wound in the cornea; through this it was seized with a straight iris forceps and extracted. The corneal wound healed quickly and kindly.

The cataractous mass absorbed in the course of five or six months; when this absorption was nearly complete, it was discovered that the temporal lip of the anterior capsular wound was attached to the scar in the cornea at the site of the entrance of the piece of glass. Looking from the nasal side, one was able to see clear inside of the empty capsule. In eliciting the pupillary reflex to light, the iris impinged against the capsular attachment. As soon as absorption was complete, this attachment was severed close up to the cornea with a Knapp knife-needle, and the posterior capsule extensively needled, so that a good serviceable opening was secured.

Vision of 20/24 is obtained in the injured eye with a plus 10.00 sphere; with a plus 13.00 sphere, the patient reads Jaeger ii. The curvature of this plus 10.00 sphere, and the extremely thin edge to which it is ground, give the appearance of a toric lens, which matches its fellow very nicely. Before the other eye the patient wears his original correction of —2.50 sphere—0.50 cylinder axis 180, with which he obtains 20/20—. The apparent difference in the size of the corneas through this very unusual combination of a minus and strong plus lens, is not particularly noticeable.

A convergent strabismus of the injured eye developed soon after the accident, and is still present, but not constantly. At times marked diplopia is present; the patient states that the size of the images is equal and has been all along.

The corneal scar is very irregular, reminding one of the appearance of forked lightning. No astigmatism is present in the injured eye, in spite of the extensive corneal scarring.

A very fine splinter of glass, visible only with the loupe and oblique illumination, is still embedded in the corneal stroma at the nasal limbus, with exudate behind it; but this has been there for over a year without having changed its position in the slightest, and causes absolutely no irritation. There seems to be no reason for attempting to remove it, so long as it produces no symptoms.

The question of binocular vision in this case is an interesting one; as yet, the patient does not seem to obtain it, as evidenced by the Hering drop test and the pencil test. The author is not without hope, however, that binocular vision may yet be attained. The patient sees almost equally well with both eyes; the visual axes are parallel part of the time, and the patient is a young man of a very high grade of intelligence, who understands the condition and what is expected of him.

Whether he obtains binocular vision or not, he has come out of this serious experience with an eye which is not at all disfiguring, and one which gives him almost normal vision. The result shows what it is possible to accomplish by careful attention to these severe ocular injuries.

OPHTHALMIC INJURIES AND TREATMENT IN THE PRESENT WAR.

SYDNEY WALKER, JR., B. S., M. D.,

CHICAGO, ILL.

It was my good fortune to spend some months this summer in the Royal Army Medical Corps, both in England and in France. Hence I had a chance to see some of the work done by the different Ophthalmologists and to do a small amount myself. The following paper will give a very brief account of what one sees in the Ophthalmic Department of a military hospital in a short time.

Among the many and varied injuries that the British soldier has received in the present war, those affecting the head are relatively great in number. One factor tending to cause this is probably the necessity of head exposure in the present method of trench warfare. Of all injuries to the different parts of the head, those affecting eyes are greater than any other. Hence one would surmise from the above statement that there is a large field in operative Ophthalmology in the present war. There is, if the ordinary run of cases is taken into account, but if work along new lines and out of the ordinary is looked for around the Military Hospitals in France, then this field is quite small.

Probably the cases which the Ophthalmic Surgeon sees oftenest are those in which the eyeball is partly or wholly torn from its socket. These injuries are usually due to shrapnel which tears parts of the bony structures away and hence leave lots of plastic work to be done later on. The cornea is very often injured by dirt and stones thrown up where these shells explode, so that corneal ulcer and leucoma are often found. Ulcers in the troops clear up with fair rapidity even under the very poor conditions in which they live. There have been a few cases of gas bacillus infection following wounds of the head and involving the eye. These are treated as in other parts of the body but are usually fatal.

Many blunt objects which hit the eye give rise to rupture of the choroid, detachment of the retina and cataract. Rupture of the choroid is relatively common; I have seen three cases of very large rupture, and Colonel Lister told me that he had seen eighteen to date. Naturally one sees many cases of optic atrophy and neuritis from different etiologic factors; among these are often found freak cases. Under my observation was a young soldier through whose left nostril a bullet entered. It went up and back to the

posterior ethmoidal cells, crossed to the right side and cut the optic nerve, the point of exit being the right zygomatic arch.

There has been much notoriety given to gas used by the Germans in the war. Undoubtedly this has done great damage, but there are very few gas cases in serious condition that reach the base hospitals. The two factors that would explain this are that those who get the full effects of the gas never survive while the others are only slightly affected. Gas gives rise to a rather severe conjunctivitis and keratitis along with inflammation of all mucous membranes. Under cold compresses and atropin externally and internally these cases clear up readily.

Many soldiers are sent back from the front to a base hospital because of defective vision not caused by injury. These cases consist mostly of refractive errors and old fundus lesions. Many cases have 20/40 while others as bad as 20/100. Some disposal has to be made of them so they are sent to another base for refraction and ordered to less important duties. How is it that such men pass the examining surgeon? In the hustle and bustle for new recruits a very cursory examination of the individual is made. Furthermore part of this work was paid for by the number of men examined. In the haste to make as much money as possible, the examining surgeon in many cases neglected to examine the vision.

Total blindness, both from an economic and practical standpoint, is a big proposition to handle for the present needs and for the future. A surprising amount of progress in the handling of these cases has been made, however. Soldiers so afflicted first have what plastic work is necessary done to make them presentable, and then artificial eyes are inserted. They are then sent to St. Dunstan's in London, a home for the blind, where they are taught touch reading. When fair progress has been made they are taught basket and rug weaving so that they have a useful and paying trade. It is somewhat surprising to know that the demand for their work is greater than the supply, so that many make as much as they did previous to the war.

From good information I am told that up to August, 1915, there were approximately 2,000 of the French totally blinded. These cases are being taken care of in the same manner as those of the British.

With the large numbers of ophthalmic hospitals throughout England and the modern methods of caring for cases, the future of those incapacitated in this manner is not so dark as some years ago.

29 E. Madison St.

RETAINED FOREIGN BODIES IN THE ORBIT.

FRANK W. MILLER, M. D., F. A. C. S.,

LOS ANGELES.

Penetrating injuries of the orbit are comparatively common and a catalogue of the cases recorded includes practically everything that is small enough to reach the part.

The injuries range from those that are superficial and of small consequence to the severe, deep type that involve not only the orbit and its contents but the dura and brain with an immediate or remote fatal termination. The amount of damage inflicted is subject to great variation. The character of the agent, its velocity, its penetration and direction, together with the inconstant individual factor, makes each case unique.

Penetrating foreign bodies may or may not be retained in the wound. Those immediately withdrawn leave only the consequence of their traumatism and the possibility of infection. These do not particularly concern this paper. It is rather those foreign bodies which are retained in the orbit, unaccompanied by infection, and small enough to be completely covered by the tissue that I wish to report.

Foreign bodies reach the orbit either through the skin or conjunctiva, and rarely, through a double perforation of the globe itself. On account of the great laxity of the skin and conjunctiva the wound of entrance is small and out of proportion to the size of the object. These injuries usually involve the extra-ocular structures alone but may cause more or less damage to the globe and its contents. These latter cases make up a new group which are properly classified as ocular injuries and are not to be considered here.

Every foreign body carries with it the possibility of infection. However, the large majority of these wounds are sterile in spite of the contamination of the various agents. Perhaps the abundant blood supply and consequent haemorrhage is responsible for this, for certainly the orbit offers ideal conditions for the cultivation of organisms.

That foreign bodies should be removed at the first possible opportunity admits of no argument, for experience has proven that if allowed to remain, particularly in movable parts, they sooner or later give rise to distressing and serious symptoms. The orbit, however, shows an unusual tolerance to foreign bodies. This is even more remarkable when we consider the constant motility of

the orbital contents and the delicate nature of the tissues. The size of foreign bodies that have been long retained in the orbit is almost unbelievable; and it is difficult for one to understand the absence of all symptoms and the non-interference with the rotation of the globe, yet, in all my cases there was very little, if any, impairment of this function. All of these foreign bodies, except those imbedded in bone, are more or less movable in the soft orbital fat; and when we consider the blood vessels, and the six muscles, together with Tenon's Capsule, it is hard to understand why in practically every case, normal excursions remain.

Most cases of foreign body in the orbit seek medical aid at the time of the injury. However, a certain percentage of these cases do not do so, or having sought it disappear before any effort at extraction is made. There are some cases in which an additional traumatism is contra-indicated; and still others in which it is best to allow the foreign body to remain permanently.

The literature concerning foreign bodies in the orbit is voluminous, and the records of every oculist contain many such cases. The number of reported cases of long-retained foreign bodies is comparatively small, yet they are sufficient to impress one with the great adaptability of the orbital tissues. The absence of all symptoms in these cases, over periods varying from weeks to many years, bears testimony to the fact that in the orbit we often find a tolerance not experienced elsewhere in the organism. This is particularly a fact when the foreign body is small and with no sharp or irritating edges. When the agent is ragged or irregular and of considerable size, or of an irritating nature (copper, etc.), there must naturally be more or less disturbance attendant upon each movement of the globe, and when these symptoms become prominent they are brought to the oculist, who, unless he has a positive history, is very apt to overlook the true cause of these symptoms. In certain cases, the statement of the patient is very indefinite. Many patients have forgotten the accident which occurred years before or were never aware of the entrance of the foreign body into the orbit. A skiagraph taken at this time may be of value, but frequently the foreign body is of such a nature that it does not impress the plate and consequently escapes detection.

The following seven cases, taken entirely from a private practice, I wish to submit as illustrative of the tolerance of the orbit to foreign bodies.

The recital of some of these cases carries with it experiences that were embarrassing at the time, but were of great subsequent

value to me, and I hope that they will be of some small benefit to others.

Case 1. J. D., 14 years. School boy. While playing, fell on a sharp redwood stick which penetrated the skin $\frac{1}{4}$ -inch below the border of the right lid. The stick was broken off in the wound; and when seen two hours later, the small, ragged wound was sealed with a blood clot. There was slight conjunctival irritation, but no injury of the conjunctiva. On probing, could feel foreign body, which was easily removed after enlarging the original wound. The foreign body consisted of a piece of redwood $\frac{1}{4}$ in. x $\frac{1}{4}$ in. at the base tapering to a sharp point $1\frac{1}{2}$ inches long. The wound healed promptly without the slightest disturbance and the patient was lost from sight.

About ten months later the lad again came to me saying that his eye was and had been entirely free from all symptoms, but that he had a small, red and hard place on the skin of the lower lid $\frac{1}{4}$ -inch to the nasal side of the original scar. This did not distress him in any way, but since it had been there for two weeks he would like to be rid of it. On opening through the skin I immediately came to a foreign body which I removed, and found to be a redwood splinter in perfect condition, and of practically the same dimensions as the one removed ten months before.

Redwood splits very easily and in grasping it, I had evidently broken it lengthwise and had removed but half of it. Careful exploration at the first operation would have saved me much embarrassment. This large foreign body remained in the floor of the orbit, reaching almost to the apex, with an entire absence of symptoms, for ten months.

Case 2. C. W., 50 years. Engineer. Ten weeks before, while a helper was driving a key from a drive-wheel, a piece was broken off which struck him with great force, cutting the upper lid and brow, and as he thought, injuring the margin of the bone.

He was brought in from Arizona and placed in the company's hospital for treatment. He was there for over ten weeks when he felt he was not recovering satisfactorily and came to see me. The first inquiry elicited the fact that several skiagraphs had been taken, and that his former surgeons were positive that the blow had been a glancing one and that there was no foreign body present. The external wound had completely healed, and a moderately severe irido-cyclitis yielded quickly to treatment so that he returned home in three weeks.

Eight months later he again came to see me, but with an artificial eye and the following tale: He said that for six months after he returned home the eye was perfectly quiet when it again became irritable and he went to Chicago. A skiagraph taken at that time revealed a large foreign body imbedded in the roof of the orbit. It was necessary to enucleate the eye in order to remove it. The steel had penetrated the orbit, dura and frontal lobe. He exhibited as evidence of his veracity a piece of steel, 5 mm. wide, 3 mm. thick, and 2 cm. long.



Fig. 1. Steel in orbit. Four months duration. See Fig. 2.

The entire absence of orbital and intra-cranial symptoms in this case is unusual. Had I taken my own skiagraph instead of depending upon the statement of the patient, the steel would have been discovered by me, and I should have avoided a very unpleasant experience.

Case 3. C. F. F., 35 years. Machinist. Four months ago this patient was struck in the right eye by a flying piece of steel from the head of a tool. This was very painful, knocking him down, and haemorrhage was very profuse at the time. The vision was

unimpaired and the patient did not seek medical aid. Two days later the eye was comfortable and normal.

At the present time, four months after the injury, patient complains of a sharp, cutting pain each time that he moves his eyeball. On careful examination no wound was discovered and there was nothing observable to account for the symptoms complained of.

The accompanying skiagraph (Fig. 1), taken at this time, shows a large piece of steel in the orbit. This was removed with considerable difficulty by a magnet through an opening in the conjunctiva above and toward the nasal side. The foreign body proved to be a piece of case hardened steel with a knife-like edge on one side (Fig. 2). Recovery was without incident.

Undoubtedly, the sharp nature of the steel was responsible for the severe pain and distress on movement of the eyeball. I am unable to explain why it should remain quiet for four months and then produce these marked symptoms.



Fig. 2. Steel with knife-like edge. Actual size. See Fig. 1.

Case 4. C. B., 3½ years. Male. This child was brought in with a very indefinite history. The mother stated that when she returned home after an absence of two hours, she found the child with the corner of his right eye bleeding and swollen. The child was unable to enlighten her as to what had happened. On examining the place where the injury occurred, the mother found part of a broken penny lead pencil which she thought perhaps the child had fallen upon. The eraser end of this pencil was missing.

The child was extremely hard to manage and examination was practically impossible. A small wound and tear of the conjunctiva at the outer canthus, together with several small superficial cuts and bruises on the skin, were the only things we could determine at this time. The mother refused to allow either an X-ray or an anaesthetic. The child was given 1,500 units of tetanic serum and dismissed rather summarily with instructions that if she wished anything further done the child would have to have an anaesthetic.

Five weeks later the child was returned. The eye had been quiet and comfortable until the day before when some redness and secre-

tion appeared and there was some swelling of the lids. A small amount of granulation tissue was found at the outer canthus. With the consent of the mother the child was sent to a hospital, anaesthetized, and several pieces of wood with the rubber eraser from the end of the pencil (Fig. 3), were removed through the original wound and from deep in the orbit. Recovery very prompt and uneventful.

That this large amount of foreign material should remain and allow for normal motility can only be accounted for by the fact that these several pieces were distributed in the orbital fat in the outer half of the orbit and extending from the margin to nearly the apex.

Case 5. W. C., 21 years. Male. While hunting, this young man received a single No. 1½ shot in the eye. It entered the center of the cornea, ranging upward toward the nasal side, passing under the iris, through the lens and emerged from the eyeball about the equator.



Fig. 3. Wood and rubber from a broken lead pencil (actual size). Five weeks in orbit.

On account of the collapsed condition of the globe, localization failed to determine whether the shot remained in the sclera or just outside of it. An exploratory dissection was made down along the sclera and vitreous encountered which of course proved the eye to be doubly perforated. The swollen lens soon blocked the anterior wound, and in a few days the posterior wound closed. The tension which was very much diminished at first, became considerably elevated later, but as the lens substance was absorbed it gradually became normal, and the eye today is in a very quiet condition.

This accident occurred about six months ago, and the presence of the shot in the orbit (Fig. 4), has given him no trouble.

Case 6. B. K., 10 years. Female. This little girl received a charge of No. 6 shot in the head and neck. The shot was fired through the side of a house and was partly spent before reaching her. Most of the superficial pellets were removed before she was

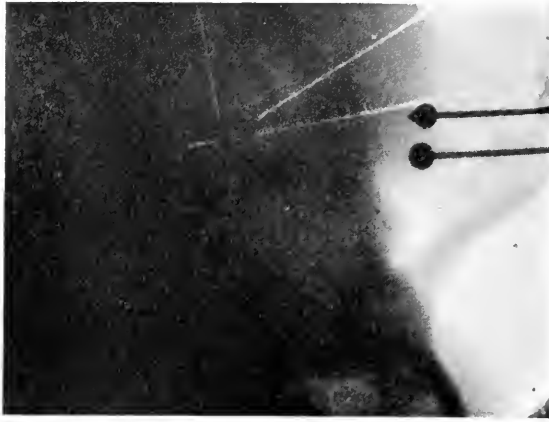


Fig. 4. No. 71 $\frac{1}{2}$ shot in orbit—6 months duration.

brought in to me. Several remained in the face and head, and one (Fig. 5), was lodged in the orbit behind the eye and in the vicinity of the optic nerve. The eye was normal in appearance and movements, but the vision was completely lost, due to total atrophy of the nerve. No effort was made to remove the shot. This accident occurred seven years ago. The child has reported from time to time



Fig. 5. No. 6 shot in orbit for seven years.

and there has been absolutely no disturbance or symptoms in any way indicative of its presence. The eye, while totally blind, is still perfectly normal in appearance.

This case, together with Case 5, illustrates the advisability of allowing certain small, non-irritating and sterile foreign bodies to remain in the orbit. Any effort to remove either one of these would have been attended with an additional traumatism that would have been unwarranted and disastrous, and their subsequent behavior has proved the value of conservative treatment. I do not anticipate any future trouble in either of these cases.

Case 7. G. F. C., 54 years. Male. History of having been injured in a premature blast five years before. The right side of the face was filled with small pieces of broken rock, and the eye was also injured at the time. Recovery was somewhat tedious but uneventful.

The eye was free from all symptoms until one month ago when a mild attack of iritis occurred. Skiagraph (which has been mis-



Fig. 6. Broken rock (actual size) in orbit five years.

laid), showed three pieces of rock in the orbit to the upper temporal side and slightly behind the eye. These pieces (Fig. 6), were removed under ether through the skin. There has been no subsequent iritic disturbance.

In spite of the roughened and irregular edges of these foreign bodies there have been no symptoms for five years, and had not their presence been discovered accidentally, I am inclined to the belief that they would never have given trouble. The iritis was specific and not dependent upon their presence.

As long as a retained foreign body in the orbit is producing no symptoms and is not likely to cause disturbance of function, and the patient can be kept under reasonable surveillance, it is unwise to resort to measures that would involve or threaten the welfare of the eye. It should always be born in mind, however, that symptoms may occur that can easily be overlooked and attributed to other causes.

Certain vague, indefinite and low-grade lesions of the eye and orbit that are persistent and recurrent should arouse the oculist to the possibility of a foreign body in the orbit. These cases usually present a mild but unyielding form of uveal disturbance with diminished accommodation and a variable pupillary state dependent upon the degree of irritation produced.

An interference with motility, distress or pain on rotation of the globe, independent of inflammatory changes in the orbit or surrounding sinuses is very suggestive and should be looked upon with suspicion.

Since the history is often misleading, and the symptoms obscure, a diagnosis can only be made after a careful exclusion of all other possible causes. An X-ray should always be taken, but it should be remembered that a negative picture is of little value in the face of prominent clinical symptoms. The skiagraph often fails to register the presence of the foreign body particularly, if as so commonly happens, it is wood and unable to cast a shadow through the dense bones at the base of the skull.

Rare judgment is often required to determine these cases and as an aid, a moderate amount of exploration is justifiable providing it can be accomplished without too much traumatism. No definite lines of treatment can be suggested, for each case requires special consideration and individual handling.

Here, as elsewhere in surgery, resourcefulness is the chief factor in obtaining a result.

1020 Merchants National Bank Bldg.

MASSAGE IN GLAUCOMA.

A. A. BRADBURN, F. R. C. S. (Ed.)

MANCHESTER.

(A paper read before the Liverpool Medical Society.)

No apology should be necessary for my bringing to your notice anything pertaining to that everhaunting bogey glaucoma.

For all that an explanation may be deemed requisite and mine is that the measures I wish to draw your attention to are such as come within the province of the general practitioner not only to carry out but to see that it is properly and efficiently performed by the patients themselves. Massage of the eye, despite its great antiquity from the days of Hippocrates, does not seem to have, in modern times, the attention paid to it which I fancy it deserves.

Nowadays it is chiefly employed in the treatment of corneal opacities to assist their clearing and for the removal of the nodules left by inflammatory processes in the sclera. By French surgeons it has been recommended for errors of refraction and in certain types of accommodative asthenopia. In thrombosis of the retinal veins and in embolism of the central retinal artery good results have at times been reported by the use of deep massage on the eyeball. The above, with some eyelid affections, forms practically the modern day extent of its employment.

To those I wish to add its employment in cases of excess of the intraocular pressure which is commonly known as glaucoma. The benefit obtainable by its use in such cases has been noted by others, but I am unaware of any who recommend it as a *routine treatment*. Pagenstecher, in 1878, in a preliminary communication mentions his surprise at the effects of massage in the lowering of the intraocular pressure. Darier also speaks of the prompt improvement brought about by it in glaucoma and says that the pressure brought to bear upon the cornea drives back the iris and lens, frees the irido-corneal angle and facilitates the exit of the intra-ocular fluids, and although it cannot replace iridectomy when properly applied, renders great service.

Despite the above laudatory recommendation he fails to give any special directions as to its correct method of employment. Domec, in 1899, published several cases of attacks of acute glaucoma speedily relieved by frequently repeated sances of massage.

The effects obtained by massage of the eyeball may be held due to a combination of three actions, viz.: (a) Mechanical, that is a direct alteration in the shape of the eyeball and the position in the

eye of its various parts. (b) A tonic action on the ciliary muscle. (c) A trophic action upon the intra-ocular circulation—circulatory, secretory and excretory. The results obtained will naturally vary by the share which each of these three have in the process and will be dependent in no small degree upon its method of application.

Massage can be applied mechanically or manually; and practically speaking in but two places; either directly through the sclera behind the junction of the sclera and cornea or directly along the optic axis on the center of the cornea. Manual methods by means of the finger tip, through the closed lid, is the commoner and much to be preferred. In fact, for reasons presently to be stated, mechanical methods are inadmissible in the treatment of glaucoma.

Darier, whom I have already quoted, says that although massage renders great service yet it cannot replace operative measures. To a certain extent this is true but my experience of the benefits obtainable by massage have been so very favorable that I would lay it down as an axiom that no case of chronic glaucoma should be operated on until the case has been carefully watched and treated during a period of treatment by massage with, as well, a modified course of miotics.

Drug treatment alone, we all know, will keep a case of chronic glaucoma under control for years without any need for operation. In time, however, the eye gets used to the drops and when these have to be made stronger the eye becomes irritated and irritable, which alone may cause a rise of tension. It is particularly under such circumstances that we find massage so peculiarly beneficial in that it assists the absorption of the drugs and by lowering the tension lessens the need for frequent application of the drops.

Operation is primarily resorted to as a precautionary measure to ward off an acute attack in cases of chronic glaucoma, and is of course resorted to for the purpose of reducing the pressure when it has got out of hand. Massage, however, can in a large number of cases do almost as much if properly applied and as an adjunct to operation is simply invaluable. To confirm the above statement let me relate briefly the case of Miss W——. I attended her first during Christmas week of 1914 for an acute attack of glaucoma in the left eye. The right eye was blind from the same disease and had been operated on some years before. Under chloroform I punctured the vitreous. The next day the vision had returned and later I instructed the patient to perform massage herself and for three months the tension was kept well in hand. However, she had another acute attack and under chloroform I repeated the former

operation and at the same time did an iridectomy. Once more the vision returned and with massage the tension was kept under till August of this year, when during my absence a third acute attack came on. By this time she had become an expert in auto-massage. She went to bed, took a sharp purge, put in some sweating drops and massaged the eye every hour and in less than twenty-four hours it had passed off, leaving the vision as good as before. I must explain here that the vision in this case was particularly poor and had been failing for many years as she is the subject of retinitis pigmentosa. I am inclined to think that the recurrence of the acute attacks in this case may be due to blockage of the excretory channels by particles of migrating pigment. The above case demonstrates not only the value of massage but illustrates its usefulness in another manner and to my mind it is a feature which if the actual massage were of even less practical value would make its adoption almost compulsory. "By this I mean its usefulness as an indicator of the state of the tension in the intervals of our seeing it."

A patient who has once thoroughly learnt the art of self massage is in a position to afford us the greatest possible assistance as to progress of the tension during the intervals between their visits to us. Our patients can then tell us of little and unsuspected rises of tension which occur even after the performance of what look like classical operations. I have operated on cases myself and seen others performed by others which to all intents and purpose were as perfect as could have been desired and when tested for pressure apparently confirmed this. Yet if put through the critical test which auto-massage confers, have been proved to be faulty. Reports received of such lapses soon kill any conceit we might otherwise possess in our operative skill. The confidence begotten by seemingly perfect operative technique has in many cases led to the mistaken diagnosis of the onset of optic atrophy as a result not due to the continuance of the pressure.

Again auto-massage comes to our assistance in those perplexing cases of quiet glaucoma which in their early stages afford so few objective signs on which to base a definite diagnosis.

For over six months I and the patient, by auto-massage, most carefully watched the onset of a case in a young woman of only thirty-two. As time passed the typical picture of cupped disc gradually developed but the certainty of its approach had long before been definitely settled by the reports of fleeting rises of tension furnished by the patient herself. In this case I trephined with an

added iridectomy the left eye, a seemingly perfect operation, and yet occasional rises of tension were detected by the patient and I had to do a scleral section later. On the left I performed a modified iridectomy followed by early massage and in this case only once in twelve months was any rise of tension detected but in the other occasional rises are still reported.

I would like to relate yet another case in which massage proved of particular value. Some three years ago I trephined for chronic glaucoma the right and only remaining useful eye of a lady of middle age. Being of a gouty disposition the eye became attacked a fortnight later with the result that the trephine hole became blocked completely and the object of the operation nullified. This patient had a daughter who was a professional masseuse and I taught her how to massage her mother's eye. The visual field two months after the operation was less than 20 degrees, nearer ten in parts and I looked upon the future as highly unfavorable. Her daughter, however, persevered with the massage and when I saw her several months later the visual field had increased by nearly ten degrees and the vision was 6/6 and with glasses she read Jaeger 1.

I think I have said enough to prove not only the usefulness of ocular massage in glaucoma but to support my contention that it should form a routine part of the treatment in all cases. I have employed it now for over ten years in all my cases and with invariable benefit to the patient and to me personally and in many cases I have used no other remedy.

It now only remains to state its method of application. I instruct the patient to look well down, to then rest the second fingers of both hands on the center of the eyebrow and to pass the tips of both ring fingers into the socket right under the orbital plate of the frontal bone until they meet upon the globe of the eye. Both finger tips must remain in firm contact with the eye ball whilst one finger dimples it and this will slightly raise the other. By alternately pressing first with one finger tip and then the other, the intra ocular pressure will be felt to diminish. I instruct them to compare one eye with the other or with that of a friend, to massage when dressing in the morning and last thing before going to bed. If between these periods they perceive a rise of pressure they are to repeat the process during the day and the oftener they detect a rise the more frequently must it be repeated. They are finally instructed to keep a mental note of the frequency or otherwise the lapses in the tension so as to furnish me with a report of the pro-

gress of matters. In cases which seem to require operative assistance I always start massage within twenty-four hours, gently and at brief intervals and for short séances at first, cutting my suit according to my cloth.

It may be asked, have I seen no untoward results from allowing such liberty to untrained hands. So far I have not nor have I met with any contra-indication to its use in glaucoma which we all know can do far more injury itself than any properly instructed amateur could accomplish. I have seen retinal hemorrhages occur in the course of glaucoma and have seen them clear up during the process of massage.

Massage is also of benefit in that type which arises in irritative lesions, such as in old cases of iritis, or when the eye has at one time been the subject of an injury. The relighting up of the old trouble in such eyes calls for the employment of atropine, this drug leads to rise of pressure to counteract which miotics are necessary but tend to lead to congestion again. Under such circumstances the inflammation can be kept in hand by just sufficiently strong solutions of atropine and the rise of tension combated with massage which at the same time favors the nutrition of the eye.

I have occupied already too much of your time with a subject which however interesting to me must be considerably less so to you, but before closing I would like to mention another condition in which massage is in certain cases of undoubted value. I refer to its use in short sight. Myopia, as it is called, is in the majority of instances due to an alteration in the shape of the eye ball. Its shape alters from that of an association football to one of the "Rugby" type or that of an orange to a lemon. Now it is plain that the tendency of pressure, if applied to the point of the oval, that is on the eye ball to the center of the cornea, the result would tend to restoration of rotundity. I have had cases which have reduced their axial length by half but all cases of myopia are not suitable for indiscriminate massage and the subject of their treatment by it must form the matter for a future paper.

STATE LEGISLATION CONCERNING TRACHOMA.

Paper No. 3.

FRANK ALLPORT, M. D., Chairman of Conservation of Vision Committee of the Council on Health and Public Instruction of the American Medical Association.

CHICAGO, ILL.

Trachoma is a real menace to this country, and as such, should be controlled and exterminated, and its results relieved as much as possible. It is found in all lands, and in all peoples, although the African race is probably more immune than others. It occurs in all ages, but is infrequent in infants. It is more prevalent in Egypt than in any other country. It occurs in high altitudes, on the sea-shore, and inland, in hot countries and in cold countries. It originally came from the Far East, and is spoken of in ancient Grecian and Roman literature. Its first great modern impression on the world was made when Napoleon's army returned from Africa in 1802 fairly saturated with trachoma, which it proceeded to spread to other European countries by the migration of its soldiery. It is a specific, infectious and contagious inflammation of the conjunctiva, whose bacteriological origin is unfortunately unknown, although much investigation has been performed, for the detection of the specific germ. When this is found, the entire subject will be much clarified, and human suffering immeasurably mitigated. This disease is produced by the direct transference of the secretion from a trachomatous eye, to a non-trachomatous eye, and is more virulent when the secretion is profuse. Eyes already inflamed are more liable to infection, than eyes that are not inflamed. Trachoma is a specific infection, and cannot result from evolution from an already inflamed eye. Trachoma leads to blindness in about 75 per cent of cases not properly treated. Untreated, it lasts a life-time. Probably 85 per cent of native Egyptians have trachoma. It is said that 35 per cent of the Indian population of this country have trachoma. Trachoma comes to this country principally through immigrants from Russia, Italy, Syria, Greece, Poland, Spain, Turkey, Armenia, Hungary, Finland, Bulgaria and the Philippine Islands. It is said that trachoma is an imported disease and comes to the United States, wholly from foreign countries. Doubtless, much of it *does* come through ports of entry, perhaps, *most* of it, but this does not satisfactorily explain the great prevalence of trachoma amongst our native Indians, and in the remote and isolated mountains of Kentucky and Tennessee.

where primitive people dwell, who have never even seen a train of cars, or an automobile. In some parts of Kentucky, trachoma exists in about 75 per cent of the population.

In the New York Eye and Ear Infirmary trachoma exists in about 5 per cent of the patients. This is largely due to the cosmopolitan character of the patients, and from the fact that New York is the largest port of entry in the United States. It may not be generally known that in 1882 Congress instituted what was called an "Epidemic Fund" authorizing the president to aid state and local authorities, in suppressing threatened or actual epidemics. Cholera, yellow fever, small pox and typhus, were first mentioned, and, in 1913, trachoma was added to the list. In some portions of Europe trachoma is responsible for about 60 per cent of the blindness: 18 per cent of all blindness in Russia is due to this disease, one thousand cases a year, are treated in the Lemberg hospital alone. In Japan, among 400,000 recruits for the army, 23 per cent of trachoma was found. From 1899 to 1901 about 8 per cent of all reported eye infections were due to trachoma. In the United States, trachoma is found chiefly at all seaports, and in Kentucky, Southern Illinois, Virginia, West Virginia, Northern Arkansas, Missouri, Oklahoma, Texas and in Minnesota, principally amongst the Indians and the miners, in the Mesaba and Vermillion iron ranges. In West Virginia it is much more common amongst the native white population in the remote mountain villages, than in the foreign population. During the last ten years, about 12,000,000 immigrants have been examined in United States seaports, and about 23,000 have been found to have trachoma: 30,000 people, in the last ten years, have been kept from sailing for the United States, from European ports, on account of trachoma. Realizing that enormous numbers of trachomatous people were being admitted to this country from foreign lands, and that the disease was becoming an uncontrollable menace to our population, the order was issued, in 1897, by the Secretary of the Treasury, that trachoma was a dangerous, contagious disease, and must no longer be admitted to the United States. Immigrants applying for admission to our shores, immediately dropped from 4 per cent to 2 per cent. Canada at once followed the example of the United States, and similar fortunate results followed. The decision of the Secretary of the Treasury in 1897, was endorsed by Congress in 1903, which passed a law, providing for the expulsion of all immigrants afflicted with trachoma, which was declared to be a "loathsome and contagious disease." All immigrants into the

United States should be carefully examined for the presence of trachoma. This is important not only to avoid the admission of trachomatous immigrants, but also, not to do an injustice to the immigrants themselves. A semi-latent form of chronic trachoma may exist in an individual, without his or her knowledge. On the other hand, various forms of conjunctivitis, principally follicular conjunctivitis, may be mistaken for early trachoma, especially in hurried examinations, and an immigrant deported, an act which often creates much hardship and sorrow, where for instance, families are divided, some being admitted to our shores while others are sent back to their homes. Therefore, only experts should decide upon these important matters and a competent ophthalmologist should be appointed to every examining board. The examination should include a careful inspection of the everted lids, as a low grade of trachoma may exist, without producing noticeable evidences, when looking at un-everted lids. It must not be forgotten that immigrants frequently try to avoid detection by using a few drops of adrenalin solution in the eyes, just before inspection is expected. All suspected cases should be detained for study, until an accurate diagnosis is reached. This is not only for the benefit of the United States, but also for the benefit of the immigrants, who may easily be wrongfully accused and deported. The diagnosis of trachoma is unfortunately based largely upon clinical appearance and experience, and upon the personality of the examiner. As has been said, the trachoma germ has not yet been isolated, but much assistance can be obtained by the microscopical examination of a strip of conjunctiva, as in true trachoma, the contained or bursting trachoma cell granules, can usually be found. Of course, the later stages of trachoma (hypertrophic and cicatricial) are easily detected, and doubt should only occur in the early stages, before the diagnostic lines, have been so clearly drawn. Follicular conjunctivitis tends to a spontaneous recovery with good conjunctiva, while trachoma practically never recovers spontaneously. It is quite probable, that many of the "cured" cases of trachoma, are in reality cases of follicular conjunctivitis, where a mistaken diagnosis has been made, or perhaps an erroneous opinion expressed.

Owing to the trachoma law for immigrants, and our better knowledge concerning the disease, trachoma is not on the increase in this country, in spite of the frequent occurrence of careless inspection at ports of entry. Before leaving the subject of the necessity for the strict observance of trachoma laws at ports of entry, I desire to protest solemnly against any relaxation concerning the non-

admission of trachoma into the United States until such relaxation is endorsed by a consensus of opinion on the part of the medical profession of this country. Ophthalmologists alone are capable of judging whether or no, trachoma is harmless and easily conquered, and I would advise the immigration officers of this country, instead of officiously and ignorantly settling this subject themselves, or of being satisfied with the opinion of one or two Ophthalmologists, who may choose to consider themselves the conquerors of trachoma, and as being more or less persecuted by their professional brethren, for holding heterodox views on the subject, to seek advice, before acting, from some representative Ophthalmological body, such as the Ophthalmic Section of the American Medical Association. This society would be *rejoiced* to know of the down-fall of trachoma, and would be prompt in its recognition of its obligation to the scientist who had accomplished this great service to humanity. These remarks would never have been made, had I not been told certain occurrences bearing upon this subject, by a prominent official, connected with the Immigration Bureau. It seems that some time ago, some of the Immigration Bureau officials were much impressed by the apparently curative results obtained in trachoma cases by a most eminent and skillful Ophthalmologist, who was using brassage, etc., as a means of cure. This gentleman is reported to have declared his belief in the easy and quick cure of trachoma, and to have expressed the opinion that it was no longer necessary to deport such cases. The Immigration officials visited the eminent Ophthalmologist's hospital and studied some of his cases, and thought most seriously of recommending the suspension of the present trachoma regulations. I imagine, however, that further consultations with Ophthalmologists induced them to avoid taking this unfortunate and misguided step. The entire situation was one of complexity and difficulty, where no one was to blame, but where enthusiasm and credulity, nearly precipitated an irreparable misfortune. The Ophthalmologist was not to blame for his enthusiasm, as he witnessed his beautiful results and the officials were not to blame for their credulity, in believing that easy and rapid cures were being performed, and that the embargo against trachoma should be now lifted. It should, however, teach a valuable lesson, viz., that important steps of this nature should not be taken, without exhaustive investigations. Personally, I believe in the curability of most cases of trachoma but there are many experienced Ophthalmologists, who entertain entirely different views. In other words, the profession is not at all of one mind

on the trachoma subject; it is not settled. The means of treating this disease are known the world over, there are no secrets concerning the various procedures, surgical and otherwise. The brassage method used by the Ophthalmologist, who so impressed the Immigration Officials, has been tried for years, by all Ophthalmologists. Some use it, and others have discarded it. It is a good method, when used temperately and properly, but it cannot be depended upon to cure easily, promptly, and surely. Many cases of bad follicular conjunctivitis, are called trachoma, and "cured," and the method used, is much extolled. Other cases of *real* trachoma, are relieved by any of the surgical procedures advocated by various authors, and are *thought* to be cured, until the deep seated tarsal infections spring into activity; the "cure" dream evaporates, and the surgeon is again face to face with one of the big problems in Ophthalmology. Whatever the discouraging views of the medical profession may be concerning the curability of trachoma, and of the varying methods of achieving the best possible results, one fact stands out, so clearly that hardly anyone will have the temerity to dispute it, viz., there is no Royal Road to cure. No method is always or even *nearly* always dependable. Success may be attained at last, but as a rule, it will only be achieved by using every means at hand to combat the enemy. Laboratory or other work will probably some day solve this problem, but until it is solved and is officially acknowledged to *be* solved, trachomatous patients should absolutely be denied admission to this country. There is but little encouragement in spending time and money, and work, in endeavoring to exterminate trachoma from Kentucky, West Virginia, Southern Illinois, etc., if fresh material is to be constantly supplied from our ports of entry.

In 1912, the American Medical Association, requested Congress to look into the trachoma situation, and in August of that year Congress appropriated \$10,000 for investigating trachoma and other contagious diseases, particularly amongst the Indian population of the United States. This sum, although small, has materially assisted us in our knowledge of trachoma, and *should* be an encouragement to Congress and to the various state governments to give their moral and financial support towards the extermination of trachoma. This should be done for moral and sociological reasons, but if the United States and the various state governments cannot rise to such sublime heights, let them at least do it as a financial investment, for it would be far cheaper to eliminate trachoma than to pay for its existence. I may say in passing, how-

ever, that this is a phase of financiering, that apparently does not appeal to the average law-makers.

In order to know best how to deal with trachoma, and what should be the nature of legislative enactments calculated to protect afflicted individuals, and the balance of the population, it is necessary to form some essential idea as to what constitutes favorable conditions for the development of this disease. Perhaps no fact stands out so conspicuously in this connection, as that ignorance, filth, and over-crowding, produce conditions most favorable for the conception and progress of trachoma. This is a large subject, and I shall not attempt to discuss the details very closely, but there are a few important elements that should be considered as nearly as possible, remembering that very poor people cannot surround themselves with ideal sanitary conditions, but still insisting, that such conditions should be maintained as nearly as possible, especially when trachoma has already commenced a threatened invasion.

1. Abolish the common family towel, wash basin, soap and drinking cup.

2. Admit all possible fresh air and sun-light, to buildings.

3. Avoid over-crowding, and sleeping two or more in a bed, and using the same bed-clothing.

4. All buildings should be protected from flies and mosquitoes by trustworthy screens.

5. Strict personal cleanliness should be maintained by bathing, washing, changing of clothes, etc. Homes, schools, factories, etc., should be kept clean and sanitary.

6. Avoid rubbing the eyes, especially after touching door knobs, stair railings, books, etc., particularly where trachoma is known to exist.

7. Keep the general health in as good a condition as possible.

8. The inhabitants of trachoma districts, can be greatly benefited by improving their intelligence, by talks, visits by doctors and nurses, demonstrations, moving picture lectures and the judicious and free distribution of well and plainly written printed matter. Nothing short of new, cheap and sanitary homes and buildings will answer the purpose in many poor neighborhoods and towns.

9. School children's eyes should be annually examined, as a routine procedure, and where trachoma is prevalent, they should be frequently examined, and watched by doctors, nurses and teachers. If a child has trachoma, he or she, should be excluded from

school until the danger of contagion has passed. Where much trachoma exists, schools for trachoma scholars should be established. The children should be made intelligent upon the subject of trachoma, its avoidance and care, by school talks, printed matter, etc. They should be constantly cared for and treated by Doctors and Nurses, especially qualified for such work. The sanitary condition of schools, should be rigidly enforced.

10. Trachoma is abundantly found in factories, mines, Indian settlements and remote mountain villages, such as exist in Kentucky, Tennessee, etc. Under these conditions, people live in close contact with each other, are frequently ignorant, and exist under unsanitary conditions. They should be inspected, educated, instructed and strictly isolated when trachomatous. The sanitary condition of factories, mines, Indian and mountain villages, should be a matter of government inspection and enforcement.

11. An abundance of permanent and traveling trachoma hospitals and dispensaries, should be maintained in trachoma districts. Failing in this, certain hospitals should set aside certain isolated spaces, for the reception and treatment of trachomatous patients. It is better to care for trachomatous patients where they live, than to transport them elsewhere, as such transportation spreads the disease from one point to another.

12. Trachoma should be a universally reportable disease, and the authorities should regard the matter seriously, and employ every agency, calculated to avoid the spread of the disease.

A copy of the specific laws of the different states concerning trachoma is herewith given:

TEXAS.

State Board of Health Law.

Endorsed by Legislature.

Publication of 1911.

Trachoma is a contagious and reportable disease.

Law specifically referring to trachoma is as follows:

Persons afflicted with trachoma, granulated lids, or contagious catarrhal conjunctivitis, must be excluded from schools, public assemblages and from close association with other individuals, unless they are under the constant care and strict supervision of a competent physician, and hold a certificate from said physician stating that active inflammation has subsided, said certificate to be countersigned by the local health authority.

NEW YORK.

State Department of Health Law.

Endorsed by the State Legislature.

Publication of 1914.

Communicable Diseases.

Regulation 1. Communicable diseases designated. For the purpose of this code, the term communicable disease shall be held to include the following diseases, which are hereby declared to be communicable through the conveyance of infective organisms:

Anthrax.

Chickenpox.

Cholera, Asiatic.

Diphtheria (membranous croup).

Dysentery, amoebic and bacillary.

Epidemic cerebrospinal meningitis.

Epidemic or streptococcus (septic) sore throat.

German measles.

Glanders.

Measles.

Mumps.

Ophthalmia Neonatorum.

Para-typhoid fever.

Plague.

Polioomyelitis, acute anterior (infantile paralysis).

Puerperal septicaemia.

Rabies.

Scarlet fever.

Smallpox.

Trachoma.

Tuberculosis.

Typhoid fever.

Typhus fever.

Whooping cough.

Regulation 2. Reporting cases of communicable disease by physicians. It shall be the duty of every physician to report to the local health officer, within whose jurisdiction such patient is, the full name, age, and address of every person affected with a communicable disease, together with the name of the disease, within twenty-four hours from the time when the case is first seen by him. Such report shall be by telephone or telegram, when practicable, and shall also be made in writing.

Regulation 3. Reporting cases of communicable disease in in-

sstitutions. It shall be the duty of the superintendent or person in charge of every hospital, other institution, or dispensary, to report to the local health officer, within whose jurisdiction any such hospital, other institution, or dispensary is located, the full name, age, and address of every person under his charge affected with a communicable disease, together with the name of the disease, within twenty-four hours from the time when the case first develops or is first admitted to such hospital, other institution, or dispensary. Such report shall be by telephone or telegram, when practicable, and shall also be made in writing.

Regulation 4. Reporting cases of disease presumably communicable in schools. When no physician is in attendance, it shall be the duty of every teacher to report forthwith to the principal or person in charge of the school all facts relating to the illness and physical condition of any child in such school who appears to be affected with a disease presumably communicable. It shall be the duty of the principal or person in charge of every school to report forthwith to the local health officer all facts relating to the illness and physical condition of any child attending such school, who appears to be affected with any disease presumably communicable, together with the name, age, and address of such child. Such child shall be at once sent home or isolated.

Regulation 5. Reporting cases of disease presumably communicable in hotels, private households, boarding and lodging houses. When no physician is in attendance, it shall be the duty of the head of a private household or the proprietor or keeper of any hotel, boarding house, or lodging house, to report forthwith to the local health officer all facts relating to the illness and physical condition of any person in any private household, hotel, boarding house or lodging house under his charge, who appears to be affected with any disease presumably communicable, together with the name of such person.

Regulation 6. Reporting cases of disease presumably communicable by nurses and persons in charge of camps. It shall be the duty of every visiting nurse and public health nurse and of the person in charge of any labor or other camps, having knowledge of any person affected with any disease presumably communicable, who by reason of the danger to others seems to require the attention of the public health authorities, to report at once to the local health officer, within whose jurisdiction such case occurs, all facts relating to the illness and physical condition of such affected person.

Regulation 7. Reporting cases of disease presumably com-

municable on vessels. It shall be the duty of the master or person in charge of any vessel lying within the jurisdiction of the state to report or cause to be reported immediately in writing to the local health officer at such ports or landing as the state commissioner of health may designate, all facts relating to the illness and physical condition of any person in or on such vessel affected with any disease presumably communicable, together with the name of such affected person. This regulation shall not apply to any vessel within the jurisdiction of the health officer of the port of New York.

Regulation 11. Isolation of persons affected with communicable diseases. It shall be the duty of every physician, immediately upon discovering a case of communicable disease, to secure such isolation of the patient, or to take such other action, as is required by the special rules and regulations which from time to time may be issued by the local health authorities or by the state department of health.

Regulation 15. Right of entrance and inspection. No person shall interfere with or obstruct the entrance to any house, building, or vessel by any inspector or officer of the state or local health authorities, in the discharge of his official duties, nor shall any person interfere with or obstruct the inspection or examination of any occupant of any such house, building, or vessel by any inspector or officer of the state or local health authorities, in the discharge of his official duties.

Regulation 22. Preventing the spread of communicable diseases in institutions. It shall be the duty of the superintendent or person in charge of any hospital, or other institution, or dispensary, in which there is a person affected with any communicable disease, to take such steps as will, so far as practicable, prevent the spread of infective material.

Regulation 26. Exclusion from school of cases of disease presumably communicable. It shall be the duty of the principal or other person in charge of any public, private, or Sunday school to exclude therefrom any child or other person affected with a disease presumably communicable until such child or other person shall have presented a certificate issued by the health officer, or by the attending physician and countersigned by the health officer, stating that such child or other person is not liable to convey infective material.

Regulation 27. Exclusion from schools and gatherings of cases of certain communicable diseases. No person affected with chicken-

pox, diphtheria, epidemic cerebrospinal meningitis, epidemic or septic sore throat, German measles, measles, mumps, poliomyelitis (infantile paralysis), scarlet fever, smallpox, *trachoma*, or whooping cough, shall attend or be permitted to attend any public, private, or Sunday school, or any public or private gathering. Such exclusion shall be for such time and under such conditions as may be prescribed by the local health authorities, not inconsistent with the provisions of this code or the special rules and regulations of the state department of health.

MINNESOTA.

State Board of Health Law.
Endorsed by the State Legislature.
Publication of 1914.

Trachoma is a reportable disease.

Law specifically referring to trachoma is as follows:

It shall be the duty of any school teacher, employer, superintendent, foreman, or person in charge of a lodging house or boarding camp, to report to the local health officer, any person under his or her supervision who has inflamed eyes, or who complains of sore or roughened eyelids.

Upon receipt of such report the health officer shall investigate the case and if the disease is *trachoma* or suspected *trachoma*, he shall give written directions for the continuous treatment of the disease and for the precautions to be taken to prevent its spread to other persons unless the case is under the care of a competent physician and adequate precautions are being taken.

If the circumstances in any case of trachoma or suspected trachoma, requiring it, the patient shall be removed to a hospital or other suitable place and there shall be quarantined and treated during the active, infectious period of the disease.

No person affected with trachoma or suspected trachoma, shall attend school without a written permit from the health officer, certifying that the disease is under control and that no dangerous discharge exists.

KENTUCKY.

State Board of Health Law.
Publication of 1911.

Trachoma is a contagious and reportable disease.

Law specifically referring to trachoma is as follows:

Whereas, Trachoma, a highly contagious and infectious chronic eye disease, long a pestilence in the older countries, and usually spread by means of wash-basins, towels, pencils and other things

used in common by children and families, and which, without prompt recognition and persistent treatment, results in serious and permanent impairment of vision or blindness in a large majority of cases, is officially reported by experts of the U. S. Public Health Service as widespread in the counties of Breathitt, Clay, Jackson, Lee, Leslie, Owsley, Perry and adjacent sections, with many cases in Jefferson and Clark Counties, and more or less spread into almost every other county in Kentucky, presenting to officials and people problems, both health, economic and humanitarian, demanding prompt and concerted action, especially by school authorities and others having the care of children, with whom the ravages of the disease seem most disastrous:

Now, therefore, be it known, that the State Board of Health of Kentucky, in the exercise of authority vested in it by law, hereby forbids any person afflicted, or suspected to be afflicted, with trachoma, commonly known as "red sore eyes," to attend any school, public or private, in this commonwealth, as teacher or pupil, and requests and instructs all physicians, teachers, school trustees, county and city boards of health and other officials and good citizens to assist and co-operate in preventing the further spread of this disease, otherwise likely to entail misery to individuals and a burden upon taxpayers almost beyond calculation, in the light of experience with it in other and older countries. It further instructs county and city boards of health, in co-operation with their respective city councils and fiscal courts, to inaugurate and execute and to require the heads of families and other persons to execute such sanitary regulations as such board may consider expedient to prevent the spread of trachoma, which is hereby declared to be an epidemic and communicable disease, and to this end they are requested to bring all persons infected with trachoma under prompt and proper treatment during premonitory or other stages of the disease.

KENTUCKY.

Legislative Law.

Publication of 1944.

Whereas, Trachoma and Ophthalmia in the new-born, both highly infectious eye diseases, which usually result in blindness unless promptly recognized and treated, now exist in widely separated counties and sections, and everywhere show a tendency to break over official control and become widespread; and,

Whereas, So large a per cent of those who now have these diseases, or who are exposed to the contagion of either of them, will

become charges upon public charity, as to make systematic precautions against their further spread matters of great financial as well as humanitarian importance; now, therefore,

Be it enacted by the General Assembly of the Commonwealth of Kentucky:

1. That it shall be the duty of the county board of health of each county, acting in co-operation with the county medical society and State Board of Health, to arrange for an annual course of instruction or school for the physicians, midwives and nurses of such county to teach the importance, and the latest and best methods for the early recognition and treatment of, the dangers from, and the precaution to be used against, the infection and contagion to all who come in contact with cases of trachoma and ophthalmia, or any other disease of the eyes of the new-born, or with any towel, utensil or other thing used by or for them; and the importance and imperative duty of at once reporting all cases of such diseases to the county or city health authorities, as may be, and of keeping a true record of all such cases.

2. That it shall be the duty of the State Board of Health to secure the co-operation and assistance of the national health authorities in dealing with these diseases, and to prepare and issue bulletins or other literature containing professional and popular information as to the prevalence and infectious character of such eye-diseases, and the precautions to be used against such infections; and to furnish formulae and other information for the use of physicians and midwives in the management and treatment of such diseases. It shall be the duty of the county boards of health to furnish to physicians and midwives the simple drugs to be used for the indigent in preventing and in treating such diseases.

3. That it shall be the duty of every physician and of every midwife, who, while in attendance upon a baby under thirty days old or upon its mother, has observed ophthalmia in the new-born baby, and the duty of the head of a family and of a trained nurse in a family in which there is a baby under thirty days old and no physician or midwife in attendance, and the duty of the trained nurse and of the head of any institution in which there is a baby under thirty days old and no physician or midwife in attendance upon it or its mother, to report the case of ophthalmia in the new-born, within six hours after observing it, to the city board of health, if the case shall have occurred in a city then having a city board of health, or if there be no city board of health, or if the case shall have occurred outside a city, to the county board of

health within twenty-four hours after observation. And it shall be the duty of every physician to report each case of trachoma, so diagnosed by him as attending or examining physician, within five days after such diagnosis. And any physician, midwife, nurse, or head of family who fails to make the report required by this act, shall, upon conviction, be fined not more than one hundred dollars; and persistent failure or refusal on the part of a physician, midwife, or nurse to make such report, or to take the necessary precautions to prevent the spread of such diseases, shall be a proper ground for the revocation of the right to practice, after due notice and hearing, as now provided by law, for the revocation of certificates to practice medicine in this commonwealth.

4. That "Ophthalmia in the New-Born" shall be understood to be "any inflammation, swelling and redness of either eye, or of both eyes, either apart from or together with any unnatural discharge from the eye, or eyes, of a baby."

5. That all laws in conflict with this act are hereby repealed.

WASHINGTON.

State Board of Health Law.

Endorsed by State Legislature.

Publication of 1915.

Trachoma is a contagious and reportable disease.

Law specifically referring to trachoma is as follows:

All cases of trachoma must be reported to the local health officer within whose jurisdiction the case occurs, and health officers shall report each case to the State Commissioner of Health.

No child suffering from trachoma shall be allowed to attend any public, private or parochial school unless under the close supervision of a competent physician, who shall certify in writing to the school board and the health officer that the case is not in a contagious stage.

MONTANA.

State Board of Health Law.

Endorsed by State Legislature.

Publication of 1915.

Trachoma is a contagious and reportable disease.

Law specifically referring to trachoma is as follows:

No child suffering from trachoma shall be allowed to attend any public school in the state of Montana.

Teachers having reason to believe that any of the children under their care are suffering from trachoma shall notify the County or Local Health Officer and the parents of said children.

MASSACHUSETTS.

Legislative Law.

Endorsed by State Board of Health.

Publication of 1915.

Trachoma is a contagious and reportable disease.

Law specifically referring to trachoma is as follows:

The school committee shall cause notice of the disease or defects, if any, from which any child is found to be suffering to be sent to his parent or guardian. Whenever a child shows symptoms of small pox, scarlet fever, measles, chickenpox, tuberculosis, diphtheria or influenza, tonsillitis, whooping cough, mumps, scabies or trachoma, he shall be sent home immediately, or as soon as safe and proper conveyance can be found, and the board of health shall at once be notified.

SOUTH CAROLINA.

State Board of Health Law.

Endorsed by Legislature.

Publication of 1915.

Trachoma is a contagious and reportable disease.

Law specifically referring to trachoma is as follows:

Persons afflicted with trachoma, granulated lids or contagious catarrhal conjunctivitis shall be excluded from schools, public assemblages and from close association with other individuals, unless they are under the constant care and strict supervision of a competent physician, and hold a certificate from said physician stating that active inflammation has subsided and that danger of infection no longer exists.

INDIANA.

State Board of Health Law.

Endorsed by Legislature.

Publication of 1915.

Trachoma is a contagious and reportable disease.

Laws specifically referring to trachoma are as follows:

Cases of trachoma shall be excluded from school until the patient is placed under approved treatment and such cases shall be re-admitted to school only upon certificate from the health officer having jurisdiction that the cases are under approved treatment.

No employer shall require, permit or suffer, any person to work, nor shall any person work, in a building, room, basement, cellar or vehicle occupied or used for the production, preparation, manufacture, packing, storage, sale, distribution and transportation of food, who is affected with any venereal disease, smallpox, diphtheria,

scarlet fever, yellow fever, tuberculosis, or consumption, bubonic plague, Asiatic cholera, leprosy, *trachoma*, typhoid fever, epidemic dysentery, measles, mumps, German measles, whooping-cough, chickenpox, or any other infectious or contagious disease.

It will be observed that a joint law between the state boards of health and the state legislature exists in all the states where individual trachoma laws exist.

In the following states no law on trachoma exists, except to declare trachoma a contagious and reportable disease: Wisconsin, North Dakota, Pennsylvania, Tennessee, Kansas, Michigan, Maryland, Rhode Island, Vermont, California, Utah, Colorado, Louisiana, Alabama, Virginia, Ohio, New Hampshire, New Jersey, Illinois, Idaho, Arizona, Maine, and Florida. In Arizona, Maine, Kentucky, Indiana, Idaho, New Hampshire, Florida, Massachusetts, Minnesota, New York, Pennsylvania, Montana, South Carolina, Texas and Wilmington children having trachoma are not allowed to attend school.

No trachoma laws exist in Iowa, Wyoming, Nevada, New Mexico, North Carolina, Missouri, Georgia, Mississippi, West Virginia, Delaware, District of Columbia, Oklahoma, Arkansas, Oregon, Connecticut, South Dakota, and Nebraska.

The trachoma ridden state of Kentucky has gone elaborately into the subject of trachoma, both in its state board of health, and legislative laws. It not only requires the prompt reporting of such cases by doctors, etc., under penalty of a fine, but explains to the public in proclamations the seriousness of the problem—physically, sociologically and financially. It excludes from all schools trachomatous children and offers suggestions as to the general care of the disease. It arranges for an annual state board of health school, for the purpose of giving instructions to health officers: how they may best deal not only with trachoma, but with ophthalmia neonatorum as well. It urges local, state and national boards, to issue literature, bulletins, etc., warning the public against these two terrible diseases. Kentucky has certainly taken a long step forwards, owing largely to the tireless work of J. A. Stucky, A. T. McCormack and Linda Neville, and her example may well be followed by other states, that are apparently asleep on this important subject. In Indiana, laboring people afflicted with trachoma, are not allowed to work at the preparation of any kind of food. In Minnesota, the law requires the reporting of trachoma to health officers, and also requires that such officers shall see that such cases are taken care of by competent physicians, and if advisable shall

be quarantined in a hospital until the period of danger to other people has passed. The law of the state of New York is given in full, not that it treats especially of trachoma, but because it gives a fairly good representation of the law concerning communicable diseases, in some other states, and especially in those states having ports of entry.

It will be observed that the laws in this country concerning trachoma are not by any means commensurate with the dreadfulness of the disease. Only 8 states have individual trachoma laws, and of these only Kentucky has taken the matter as seriously as it deserves. In 23 states trachoma is merely classed as a contagious disease, and in 17 states no trachoma laws exist at all—and in some of these states, stringent trachoma laws are extremely necessary. Trachoma is always a most serious problem, and in some states it has become a veritable scourge, involving much physical suffering, progressive contagion, mental inadequacy, humiliating and costly dependency, and a general disruption of personal, sociological, and financial conditions. As an economic proposition, no state can afford to allow a perpetuation of its existence. It is cheaper to stamp it out. Besides this no state can afford to have this disease on its conscience. On account of the great prevalence of trachoma in Kentucky, and from the existence within its borders of such intelligent and self-sacrificing citizens as Stucky, McCormack, McMullen, Linda Neville and others, that state has set an example to other states, as to what should be done in the way of legislation against this disease, together with care, treatment, etc., calculated to ultimately rid a community of trachoma. One of the most important movements in this campaign in Kentucky and Egypt, is the establishment of movable hospitals and clinics, in localities, where trachoma is most prevalent. By doing this, the spread of the disease is much diminished, care and treatment are brought to the very doors of the sufferers, and communities are educated to scientifically, and intelligently, combat this enemy to vision and happiness. As I have before stated, good *laws* alone do not cure evils. *Good laws must be obeyed.* Good laws are necessary as a foundation for desirable evolution. Therefore good laws should be passed in the various states concerning trachoma, and this must be followed up by the wide-spread distribution of intelligence and desire, and the *punishment of the guilty*, even if such guilt is found in the highest walks of professional life. Kentucky is punishing the guilty, let other states follow her example! A few cases brought to justice will work wonders in inspiring people to obey the law!

† W. Madison St.

"PULSATING EXOPHTHALMOS TREATED BY SLOW
OCCLUSION OF THE COMMON CAROTID
ARTERY WITH THE NEFF CLAMP."

DR. STEPHEN D. BRAZEAU,

SPOKANE, WASH.

The only methods hitherto used for the treatment of traumatic pulsating exophthalmos are ligation of one or both of the internal carotids, intraorbital excision of the aneurysm, external compression of the common carotid, gelatin injections, the administration of drugs and rest with the view of lowering blood pressure, the ligation of one or both common carotids, the ligation of the superior ophthalmic vein. de Schweinitz, Holloway and Bedell report 246 cases to date and although these cases are quite carefully tabulated it is impossible to draw any definite conclusions regarding the best method of procedure. All of these methods with the exception of the ligation of the common carotid and ligation of the superior ophthalmic vein have been of little or no avail and the former although immediately successful in a small percentage of cases, is attendant with grave danger to the patient. The patients who recover suffer with cerebral ischemia for months or sooner or later develop symptoms of cerebral softening. The mortality following ligation of the common carotid as reported by various surgeons is 25% to 50%, death being due to anemia of the brain, secondary hemorrhage, or cerebral disturbances.

According to Le Fort 45% of cases have cerebral disturbances. Siegrist's statistics show 38%, Jordan 25%, and De Fourmestreaux (French Congress of Surgeons in 1908) reported 21% in his personal experience. Bryant and Buck state that out of ligation of the common carotid in 789 cases, for various reason, 323, or about 41% died. Danger not only occurs from cerebral softening but also from thrombosis.

Abernathy in 1798 was the first to attempt tying the common carotid to arrest bleeding and in 1806 Sir Astley Cooper successfully ligated the vessels for aneurysm. Since then a number of cases are reported and the rate of mortality, owing to modern methods and asepsis, has become less. But in spite of modern surgical technic the danger of sudden death from cerebral and other complications make the method of the ligation of a large vessel a very unsatisfactory mode of treatment. All of the men who have attempted the procedure realize this risk and have suggested the use of metal clamps as advocated by Lambotte, Matas, or Halstead for gradual occlusion.

Halstead's method consisted in the use of aluminum bands bent so as to include the artery but it accomplished only partial occlusion. Matas's bands were similar to those of Halstead but no more effective. Keen devised an apparatus by which he applied two bands and approximated them with an adjusting screw. Stratton, of Oakland, California, in the *Journal of the A. M. A.* of March, 1906, described an appliance used by him in slow occlusion of the abdominal aorta for aneurysm. It is a very ingenious apparatus but the results in this case were fatal.

The method which I wish to report in this paper is slow occlusion of the common carotid in the treatment of a case of pulsating exophthalmos accomplished by the use of a clamp devised by Dr. James Neff, of Spokane. In this patient the results were immediate and in the two years which have transpired no untoward results have occurred.

The clamp consists of two aluminum bands with hinge joints. Upon the free ends are two grooves—a deep one in which the catgut is retained for the regulation of the distance between the plates and the automatic occlusion of the artery as the catgut absorbs, and a second groove in which a band of dental rubber is wound to approximate the plates gradually without wounding the intima of the vessel. The size of the aluminum bands will depend upon the vessel included. (See Fig. No. I and No. II.)

The patient, A. H., age 39, a county charge referred to me by Doctor B. H. Roark July 25, 1913, presented the following history: Four years previous he had gotten into an altercation with a fellow

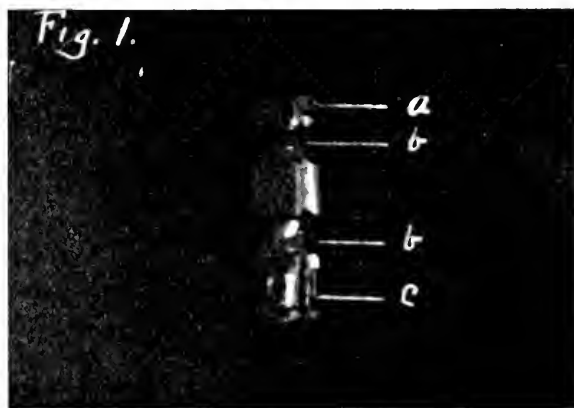


Fig. 1
Neff clamp—actual size.
a—hinge joint.
b—groove for dental rubber.
c—groove for catgut.

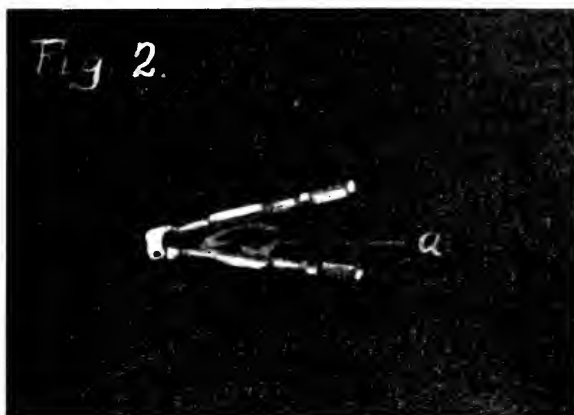


Fig. 2
Neff clamp—side view, showing artery in position for approximation of plates by means of dental rubber.

laborer who gave him a terrific blow on the left cheek. He expectorated blood all night and felt indisposed but went to work next day. There occurred a roaring in the right ear two days afterward which sounded like the noise of an engine, and so intense at night he could not sleep lying down so sat up in a chair. This condition continued for two months. Three months later the right eye suddenly began to bulge, following a severe pain in temple. He was not incapacitated for work but complained of dizziness, diplopia, and attacks of faintness. He remained at work until the exophthalmos, roaring in head, loss of vision, and faintness grew so intense

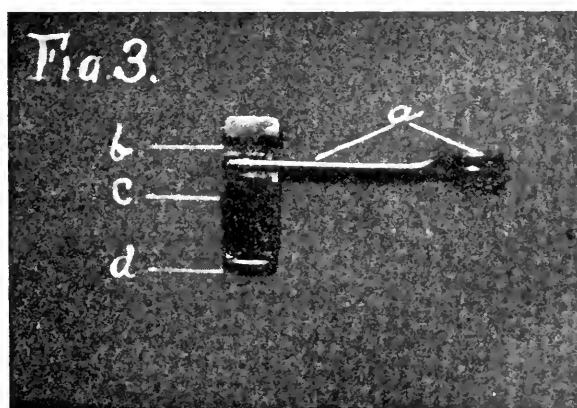


Fig. 3
Cunningham's modification of Neff clamp. Clamp is shortened to avoid pressure upon trachea, adjacent nerves, or blood vessels and plates are approximated by means of a metal spring lying parallel to the carotid.

that he fell in a seizure and was unconscious for some time. He was removed to the Sacred Heart Hospital by Dr. Roark, who later referred him to me for enucleation of the right eye. The patient showed upon superficial examination a decided exophthalmos, enlargement of the superficial veins of the temple, paralysis of the external rectus muscle and congestion of the ocular and palpebral veins of the conjunctiva. The vision was reduced to counting fingers. The case was so interesting that a more careful examination was made at the office. There was a pulsating tumor upon digital examination of the orbital roof, a distinct bruit over the eyeball and supraorbital space (easily heard with the stethoscope) and fundus examination showed marked dilatation of the retinal vessels, and a haziness of the disc. Left eye vision 6/6, and right eye vision fingers at three feet.

The diagnosis of pulsating exophthalmos was apparent. The patient was the father of eight children, incapacitated for work and ligation of the common carotid was advised. He was told of its attendant danger but decided to take the risk. It was such an ideal case for the employment of the Neff gradual occlusion clamp that it was decided to try it upon the patient as it had been successfully used in experimental work upon the lower animals.

Upon July 30, 1913, Dr. A. T. R. Cunningham, assisted by Dr. M. M. Patton, exposed the right common carotid and applied the device as described by Neff in an article in the *Journal of the A. M. A.* of August 26, 1911.

The pulsation and bruit disappeared in four days, the patient was comfortable and slept in a reclining position. In ten days he left the hospital with all annoying symptoms gone. The exophthalmos and dilation of the conjunctival veins gradually subsided and upon September 30, the patient was at work. February 12, 1914, there was still a bulging, the veins still somewhat congested but vision with correcting glass had returned to 6/15 and the patient was feeling fine. Upon September 3, 1914, the exophthalmos was hardly perceptible, motility of the eye normal, there was no bruit, and no pulsation. Vision with correction had reached 8/10. With right eye he read number 2 Jaeger. Upon April 27, 1915, examination showed a complete retraction of the globe into the orbit, no bruit, no pulsation, no congestion of the conjunctival vessels or the veins surrounding the orbit and restoration of vision to 8/10 with his correcting lenses. He is free from dizziness and has had no fainting spells since the operation and has been working as deliveryman since August 30, 1913, one month following operation.

From our experience in this case we conclude or suggest that in cases of pulsating exophthalmos or any other case where occlusion of a large blood vessel is indicated, the most practical method is gradual occlusion by means of the Neff clamp. It seems to meet the requirements in such cases for it prevents the danger of a secondary hemorrhage which attends the sudden stoppage of the blood current, it gives ample time for establishment of the collateral circulation, and prevents cerebral ischemia and later cerebral softening, resulting in 50% of cases by death. It also shortens the period of recovery: in this particular case the patient resuming work within thirty days of the operation. For the technic of applying the clamp I refer you to the article appearing in the Journal of the A. M. A. by Dr. Neff, or the articles by Dr. A. T. R. Cunningham of Spokane in the Journal of the A. M. A. of January, 1914, in which this case is reported from the surgical standpoint:

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Abstracts From Recent Ophthalmic Literature

AMBLYOPIA AND BLINDNESS

A CASE OF HYSTERICAL AMBLYOPIA.—CAMPBELL, KENNETH, London (*Brit. Med. Jour.*, September 18, 1915). The writer gives a brief history of an instance of hysterical amblyopia in which the acuteness of vision varied within wide limits, being as low as 1/60 at times and as high as 6/6 at others; the field varied in the same manner; media and fundi normal; there were no evidences of malingering. Following Freund's method of endeavoring to trace every particular symptom to its source—some antecedent experience in the life-history of the individual—it was revealed that a short time prior to the onset of the visual defect the eyesight of the patient's father had begun to fail. This preyed considerably on her mind, and from then dated the beginning of the amblyopia. Having now traced the condition to its source, the next thing was to get the patient frankly to acknowledge its nature, to face it bravely, and to bring the entire circumstances of it under the criticism of the mind. This line of treatment, combined with measures adopted to improve the general health, effected a cure by the end of nine months.

C. H. M.

ANOMALIES

ALBINISM IN MAN, WITH SPECIAL REFERENCE TO THE EYE.—GAMBLE, W. E., Chicago (*Ann. Ophth.*, October, 1915). The writer points out that little is known concerning pigment and still less of "pigmentiferous cells" and that the theories on this subject are not satisfying. It is well known that the two kinds of pigment cells found in the eye differ in their embryonic origin: those known as the stroma pigment or chromatophores are in the mesoblastic layer, while the retinal pigmentiferous cells are derived from the epiblastic. These two classes of cells differ in shape and contents. Epiblastic pigment is deposited very early in embryonic life while the mesoblastic pigment in the ciliary body and iris develops in the first months or years of life. The amount of mesoblastic pigment in the normal eye of different races and different individuals varies greatly. Fuchs agrees with Coats in his statement that the amount of epithelial pigment is constant in normal European eyes, and that in man, in eyes with colorless iris and chorioid (as the

East Frisians and other extreme blond families) the pigment epithelium shows, in an average of sections, no sensible difference in amount or color from that in dark eyes.

In view of the more recent studies in albinism, the accepted definition, "a want or absence of pigment in the hair, skin and eyes, accompanied by defective vision, ametropia and photophobia," needs revision. The writer thinks this revision is well expressed by Karl Pearson's definition: "A complete albino is one whose skin is of characteristic pallor, or milky whiteness, whose hair is 'white,' tinged possibly with yellow or straw, and whose eyes have pink or red pupils, translucent irides, with the usual accompaniment of defective vision and nystagmus"; to this he could add the symptom photophobia. The leaving out of "want or absence of pigment" is based upon the microscopic eye findings in man and animals by Manz, Usher, Coats and Nettleship.

In all, six albinotic eyes in man have been examined microscopically. One is not warranted in reaching conclusions from these microscopic findings in man; but the very extensive study of such eyes in animals by these investigators corroborates them and makes the following conclusions probable:

1. The definition as made by Pearson is warranted by the findings, that clinically albinotic eyes are not, as a rule, without pigment.
2. The all important conclusion is reached that it is reduction or loss of retinal epithelial pigment, with a change in the structure of the pigmentiferous cells, that characterizes the albinotic eye and causes reduction in sight, with nystagmus as a resulting symptom.
3. Regarding the function of the mesoblastic pigment, it is probably true that it is to make a dark chamber, so that the image on the retina will have the proper contrast. These findings are confirmatory of what has long been held to be true: that the retinal or epithelial cells are much concerned with the process of vision.

The writer refers to cases of albinism of the eye without involvement of the hair or skin and reports an instance of this sort in his own practice. The prognosis is considered better where there is some mesoblastic pigment in the eye than where this is absent, for in these cases there will be, in all probability, a progressive deposit of mesoblastic pigment as the child grows older, as seen in the child with normal eyes. As to whether there is an increase in epiblastic pigment with increase of age, nothing is known. A description of the albinotic fundus and the symptoms accompanying this condition are given.

Regarding treatment, the writer says that theoretically lenses should meet the following conditions: (1) To cut off all the invisible and enough of the visible rays to prevent dazzling without reduction in vision; (2) to prevent light from entering the eye through the body of the iris and sclera. In practice these conditions are difficult to fulfill. Glass of neutral gray tint filters out the invisible and some of the visible rays, but at the same time reduces the visual acuity. The "smoked glass" is fairly satisfactory. The degree of tint to be given depends on the need of the individual patient. When the acuity of vision is fair with much dazzling, a darker lens can be used than when the vision is very poor. Light coming from the temporal side can be excluded fairly well with least disturbance in ventilation by use of fine mesh oxidized wire screen, made to conform to the contour of the temple, and light from above and below, and the nasal side can be excluded by using toric lenses (when refraction will permit) of a size to suit the particular eye. By using a light flexible half-cable temple the lenses can be held in close contact with the skin surface. The all-important consideration in the treatment of these cases is to correct the error of refraction at the earliest age at which the patient can wear glasses, usually at about sixteen months. This is especially true if the patient has squint. The clearer image that he gets from the lens and from the smoked glasses stimulates him to function with the eye, which is so necessary to its development, for we all know that after the sixth or seventh year the development of the cerebral visual apparatus is at an end, as seen in the amblyopia of the squinting eye.

In conclusion the writer points out that the microscopic study of albinotic eyes may seem only of academic interest, but that this knowledge will aid in the study of kindred pathologic conditions, such as retinitis pigmentosa, retinitis punctata albescens and leucoderma. The study of albinism will contribute very likely much of importance to the subject of heredity; the accumulation of a large number of pedigrees of albinotic stock is necessary for this study. Karl Pearson and S. H. Usher desire pedigrees and enucleated eyes in the preparation of a forthcoming monograph on this subject; they have received many pedigrees from American physicians, but no enucleated eyes. C. H. M.

ANATOMO-PATHOLOGICAL CONTRIBUTION TO THE QUESTION OF COLOBOMAS AND FORMATIONS OF PITS AT THE OPTIC NERVE.—SEEFELDER, R. (From the eye clinic of Prof. H. Sattler in the University of Leipzig. *Arch. f. Ophthalm.*, 90, p. 129), describes a so-

called pocket shaped invagination of the retina into the optic nerve of one microscopically perfectly normal eye of a new born child whose other eye showed a total coloboma extending from the iris to the optic nerve. Retina, pigment epithelium and chorioid, ended normally at the margin of the pocket and could be sharply discriminated from the tissue of the pocket. Therefore this could not be regarded as an extroversion of the retina, but seemed to originate exclusively in the optic nerve. At the pocket all optic sheaths, pia, arachnoid, and dura, were distinctly bulged out. This proved that the disturbance of development occurred in both germinal layers of the stalk of the ocular vesicle. The tissue of the pocket had towards the vitreous a funnel-shaped depression, not very wide and deep but visible with the naked eye. Ophthalmoscopically it would have appeared as a pit besides the physiological excavation. S. classes this condition like all other pit formations under colobomas of the optic nerve.

The presence of erratic nerve fibres is attributed to protrusions of the primitive ocular stalk, into which secondary nerve fibres grew.

C. Z.

BACTERIOLOGY

GRAM NEGATIVE DIPLOCOCCI OCCURRING IN THE CONJUNCTIVAL SAC.—BLUE, ROBERT, Chicago (*Arch. Ophthalm.*, November, 1915, XLIV, 652), refers to the presence of Gram negative diplococci in the conjunctival sac and classifies them as the micrococcus catarhalis, the micrococcus intracellularis, and the gonococcus.

He adds that a purulent conjunctivitis which shows Gram negative diplococci should be treated as gonorrheal; that a mild conjunctivitis showing Gram negative diplococci, should be treated as a conjunctivitis in general is treated, and cultural and laboratory methods be used to establish a definite diagnosis; and that a diagnosis of mild gonorrheal infection should not be made without exhaustive cultural and laboratory diagnosis.

W. R. M.

ON BACTERIAL INTRACORNEAL INOCULATIONS.—ZADE, M., Heidelberg (*Arch. f. Ophthalm.*, 90, p. 256), reports on his injections of diphtheria bacilli, influenza bacilli, streptococci, pneumococci, gonococci and meningococci, in 0.05 fluid, into the substance of the cornea of rabbits and in from 0.015 to 0.02 cm. into the cornea of guinea pigs with the following conclusions: For inoculation of the cornea this intralamellar injection is best adapted on account of uniform dosage and therefore more constant results. The interstitial tissue of the cornea is very little protected against pathogenic

germs, but more than the vitreous. Hence pathological phenomena may be produced in the cornea by means of bacteria, with which one does not succeed in other organs. The intracorneal inoculation of rabbits may be valuable for differential diagnosis of diphtheria bacilli from diphtheroid bacilli, since Z. elicited pathological changes in the corneal with a virulent diphtheria bacilli. In immunized rabbits intense phagocytosis follows intracorneal inoculation with diphtheria bacilli, which does not occur in the unprotected animal. Influenza bacilli can be made to grow in the cornea. Meningococci and gonococci in the cornea damage the tissue without augmentation. C. Z.

CATARACT.

A NEW CATARACT OPERATION.—CORRY, M., Delhi (*Brit. Med. Jour.*, December 11, 1915). Dr. Corry submits a preliminary note on a new cataract operation which is now being performed in Delhi. The procedure was conceived and perfected by his assistant, Pundit Hari Shanker. The essential feature of the operation is a preliminary conjunctival flap cut so as not to hamper the movements of the knife in making the incision in the eyeball. The lens is removed entire in its capsule either with or without a preliminary iridectomy. The writer gives no technical details.

As judged by the results obtained in 1,500 cases operated on in 1915, the author claims the following advantages of the operation:

1. The wound in the eyeball is closed at once by the flap so that the risk of subsequent infection is nil.
2. Prolapse of the iris and vitreous are prevented from occurring.
3. The flap is firmly adherent to the globe within a few hours, and in a large majority of cases the dressing then can safely be removed.
4. Cataract cases are now treated in this hospital as out-patients and they can go home immediately after operation, returning next day to have the dressing removed permanently.
5. No photophobia is present subsequent to the operation, even on the second day, when the patients are provided with glasses, and can see well.
6. The usual corneal astigmatism is very much less than is generally found after other operations. J. M. W.

A NEW METHOD OF REMOVING ZONULAR CATARACT.—KRÜCKMANN, E., Berlin (*Arch. f. Ophth.*, 90, p. 322). A dissection knife pierces the temporal portion of the conjunctiva in the horizontal

meridian 3 mm. from the limbus and then the corneal margin to the center of the enlarged pupil, followed by a vertical incision of the anterior capsule from the upper pupillary margin, and by a horizontal incision from the nasal pupillary margin. Then the corticalis is incised horizontally. From the temporal end of the incision the knife is introduced behind the zonular cataract for dislocating it into the anterior chamber, where it can easily be cut into pieces from behind. After a few days a lance-shaped knife is inserted 3 mm. from the limbus subconjunctivally and at the corneal margin introduced into the anterior chamber and into the cataractous masses, which by gentle lateral movements are cut and then carefully removed. The method gave excellent results, so that glasses could be ordered after 2 or 3 weeks. C. Z.

ON THE BEHAVIOR OF TRAUMATIC CATARACT DURING THE SPECIFIC "STATUS ANAPHYLACTICUS."—DE WAELE, H., Gand, Belgium (*Arch. f. Ophth.*, 90, p. 165), injected subcutaneously albumen of the lens of the same species or of cattle into guinea pigs, rabbits and young dogs, and studied the effect on subsequent monocular discission of the lens. General symptoms were never observed. The local phenomena of traumatic cataract were much more violent than in the normal control animal, as shown in tabular form. Hence W. concluded that in the sensitized animal especial coagulation generators exist or the conditions for the formation of coagula are more favorable, the healing process is retarded, the resorption commences later but is more intense. After discission the aqueous oozes and is replaced by one of much greater albumen content. In the normal animal the intermediate bodies are lacking which cause an intense reaction between the albumen of the new aqueous and the fluid or fibres of the lens, so that only a slight coagulation ensues. One may suppose, that in the new-formed aqueous of the sensitized animal, which is to be compared with the lymph and must be in close connection with the blood plasma, the circulating intermediate body is present, so that a violent reaction between the albumen of the aqueous and the albumen of the lens is possible. Thus an extensive and for a certain time enduring coagulation sets in. Hence it is easily conceived that this reaction is maximal shortly after the sensitizing injection. C. Z.

INFLUENCE OF CATARACT OPERATION ON THE INTELLIGENCE.—FUCHS, E., Wien (*Centr. f. prak. Aug.*, 39, November-December, 1915, p. 206) hardly ever observed in his clinic senile delirium

after cataract operations, since the eye not operated on was bandaged only on the day of operation and non abstinent old patients were given some alcohol in the form of wine. He now reports his opposite experience in two well educated persons near 80. Both were totally blind from bilateral cataract and half demented. After the operation which gave both good vision, the mental condition of both patients gradually improved strikingly. In lacking impressions of the visual sense, which for man is the most important, apparently the impulse for numerous associations is abolished, which in the senescent brain may lead to mental dullness. That persons who become blind early do not acquire premature mental dullness is explained by their faculty to largely supplant the impressions of the visual sense through the other senses. C. Z.

THE INTRACAPSULAR OPERATION FOR CATARACT: A SURGICAL ADVANCE.—WATTS, HARRY A., Malden, Mass. (*Jour. Ophth. Otol. and Laryngol.*, November, 1915). The author bases his support of this operation upon twenty cases he saw operated upon in Chicago by Fisher and others. He is confident that it is superior and safer than the capsular operation. We hope his enthusiasm will not be cooled by personal experience. M. B.

THE SMITH-INDIAN INTRACAPSULAR OPERATION FOR CATARACT AND THE RESULTS OBTAINED BY IT.—SMITH, JOHN J., San Francisco (*Jour. Ophth. Otol. and Laryngol.*, November, 1915). A very enthusiastic account of his own work as well as the advantages of this operation over all others. He believes it should be universally adopted. He concedes that 5 per cent of failures will occur with expert operators, which seems to me high in comparison with my own results with the old method. He seems to think that normal vision is rare except by the intracapsular method. To this I also take exception. He claims that the patient's stay in the hospital is shortened. I notice that his patients were all in the hospital twelve days and longer. Most of my cataract patients remain in the hospital not to exceed a week. For seven days he keeps them in bed. Mine are out of bed on the second or third and are given the unoperated eye on the fourth day. So far as immature cataracts are concerned I never keep a man waiting when his vision has failed in each eye beyond an industrial point for him. I have been just as successful with such lenses as any others. It is impossible for me to believe that the intracapsular operation should be universally adopted. It is a dangerous operation except in the

hands of very expert operators. I shudder at the thought of the losses a real beginner would have. Its most ardent advocates can show only one real point of advantage and that is that a secondary operation is not required. I use the capsule forceps instead of the cystotome and not more than 25 per cent of my cases need a secondary operation, and in those that do it is not an operation that inconveniences them for more than two days. M. B.

FIFTY CONSECUTIVE INTRACAPSULAR CATARACT OPERATIONS.—FISHER, W. A., Chicago (*Ann. Ophth.*, October, 1915). While at Knoxville, Tenn., he operated upon six cases of cataract, removing the lens in its capsule without loss of vitreous in each case. He contends that the only danger that is worthy of notice is loss of vitreous, because if the capsule and lens are removed at once, post-operative inflammation will be rare and secondary operations unnecessary. In the tabulation of his fifty cases there was not an infection recorded. Twenty-five had vision of 20/20 and two had 20/15. Six had 20/30 and better, two had 20/40 and the remaining 14 had from 20/50 to 20/200 with the exception of one eye lost from choroidal hemorrhage. M. B.

REMARKS ABOUT CATARACTS.—FELLOWS, C. G., Chicago (*Jour. Ophth., Otol. and Laryngol.*, December, 1915). He does not regard the extraction of the lens in its capsule in the hands of the average operator as an operation which is as safe as the old operation with capsulotomy. For unripe lenses he commends the preliminary capsulotomy operation of Homer Smith. He thinks it is a safer operation than that of intracapsular extraction and has personally been much pleased with his results. M. B.

A CASE OF SOFT CATARACT: EXTRACTION OF THE CAPSULE.—SEIDLITZ, G. N., St. Louis (*Jour. Ophth., Otol. and Laryngol.*, December, 1915). The lens of one eye only in a woman of 30 was opaque, the iris was tremulous in one quadrant. The operation was performed for cosmetic effect. A keratome incision was done and the point of the keratome was made to penetrate the capsule. The contents of the capsule was entirely fluid. The capsule was very opaque and its removal was found to be desirable as the pupil had not changed its color. Not having a hook with him he used a cystotome. The capsule was very tough and came away on the cystotome without much trouble. The eye made a good recovery with a black pupil. M. B.

CORNEA

PERIPHERAL ANNULAR INFILTRATE OF THE CORNEA FOLLOWING A SCLERAL PERFORATION.—LANE, FRANCIS, Chicago (*Ann. Ophth.*, October, 1915). Peripheral annular infiltrate of the cornea is a rare affection, met with ordinarily after small perforating injuries, but also known to occur following intraocular operations, spontaneous rupture of corneal ulcers and metastatic panophthalmitis. During ten years association with the Illinois Charitable Eye and Ear Infirmary as pathologist, 252 eyes were studied microscopically. Of this number 465 had etiologic factors capable of producing this condition, but in only one eye did it actually occur. This was in the eye of a boy in the service of Dr. H. W. Woodruff, who sustained a small perforating wound of the sclera about five mm. from the cornea on nasal side. The wound was made from a nail fired from an air-gun. In twenty-four hours' time the lids were oedematous and red, there was a purulent discharge from the conj. sac, and marked chemosis. A millimeter broad gray ring, with its more sharply defined peripheral border one to two mm. from limbus and situated apparently throughout all layers, circled the cornea, which was otherwise uniformly cloudy. A one to two mm. high yellowish exudate lay in the bottom of the ant. ch. which seemingly was hypopyon. The iris markings were very much blurred, the pupil was four to five mm. wide and filled with a gray exudate. No red reflex and tension minus one.

Enucleation was performed and the eye subjected to a most careful microscopic study. Very extensive inflammatory changes had taken place extending to every structure and part of the eye. The cornea showed the following important changes. Beginning at the sclerocorneal junction the epithelium gradually thins down on both sides for a distance of two mm., beyond which the entire epithelial covering was cast off. One and a half to two mm. from the corneal margin, on both sides, the lamellae throughout the entire thickness, especially on the nasal side, are spaced by widened lacunae closely packed with polynuclear leucocytes. Some of these spaces were distended to the extent of fifteen microns. The infiltration was most dense between the lamellae of the superficial one-third. The infiltration shades off quite abruptly on the peripheral side and gradually disappears on the central side. Not a vestige of endothelium remained on the posterior surface of Descemet's membrane, which was everywhere intact.

M. B.

EXPERIMENTAL CONTRIBUTION TO THE ETIOLOGY OF KERATOMALACIA.—GOLDSMITH, M. (*From the eyeclinic of Prof. H. Sattler in the University of Leipzig Arch. f. Ophth.*, 90, p. 354), reports on his experiments on young white rats (up to the weight of 190 grams) in which he produced by partial imperfect nutrition the clinical and anatomico-pathological picture of keratomalacia. The symptoms disappeared by adding to the food 2 cem. of raw skimmed milk, the action of which is not due to its contents of albumen, fat, carbohydrates, salts, but to still unknown substances necessary for the maintenance of life. G. considers it probable that with regard to its etiology the keratomalacia of the rats belongs to the clinical pictures of experimental scurvy and Beriberi. Clinical, experimental and anatomico-pathological analogies between the keratomalacia of rats and human keratomalacia suggest that also in human keratomalacia partial malnutrition plays an essential part. C. Z.

ON KERATITIS PUSTULIFORMIS PROFUNDA.—FUCHS, ERNST. Wien (*Arch. f. Ophth.*, 90, p. 13), reports the clinical histories of 15 cases of this rare affection, with the anatomical examinations of 4 eyes. The disease is characterized by yellow infiltrations of varying size and shape in the deep layers of the cornea in the pupillary area. They may be as small as the head of a pin and may be arranged in a straight or circular line. The yellow spots generally are surrounded by a faint grey focus which without sharp borders passes into the fine diffuse opacity, extending over the whole cornea and consisting, under the loupe, of minute grey dots. The surface of the cornea is always dull and anesthetic, but there is no defect of substance. The corneal affection is always associated with a severe iritis. The iris is swollen and discolored and often covered by pus, and there are always synechiae and membranous exudates in the pupil. Above all the iritis is characterized by a large hypopyon which, if evacuated by puncture, is rapidly replaced. In most cases it is free from germs. The course of the disease is always chronic. The yellow spots may grow larger, or new spots may arise, but never such an extensive yellow discoloration of the cornea occurs as in serpent ulcer. The prognosis is better as the yellow spots never are transformed into ulcers. Their further fate is their conversion into permanent grey deeply situated and often vascularized opacities. This takes place in from one to several months. Vision is permanently impaired by the opacities and the sequels of iritis, synechiae and pupillary membranes. In the most severe cases a moderate degree of atrophy of the eyeball with blind-

ness or mere perception of light ensues. The disease generally affects only one eye. In two cases of Fuchs both eyes were equally diseased. It befalls older people; more than half were over fifty. With one exception it occurred in men.

The anamnesis gave no clue with regard to the etiology, but an injury could be excluded with certainty, and the clinical and anatomical findings did not speak for an ectogenous infection.

Fuchs concluded from his observations, that the disease commences with an apparently spontaneous iritis of unknown cause, which affects the posterior layers of the cornea by secretion of toxic substances into the aqueous. Four out of the fifteen cases had lues, which may be thought of most as etiological factor. The anatomical examination revealed no evidence of tuberculosis. Fuchs applied the name *pustuliformis*, because the yellow infiltrations look like pustules, but, as the anatomical examination disclosed, are not pustules.

C. Z.

A CASE OF UNUSUAL AFFECTON OF THE CORNEA IN CHOREA MINOR, EXAMINED WITH ABDERHALDEN'S METHOD.—VON HIPPEL, E., Halle (*Arch. f. Ophth.*, 90, p. 246). A boy, aged 12, presented after an injury a few weeks previously, numerous fine dotted defects of the epithelium of the cornea, conjunctival and ciliary injections, hypotony, with chorea minor. There was no marked status lymphaticus but Abderhalden's test showed positive reaction of thyroid, suprarenal glands, testicles, and hypophysis. After six months the keratitis punctata superficialis and the chorea had entirely subsided, and now the serum reacted differently, viz., only the thyroid and the suprarenal glands slightly. As a definite etiology of keratitis punctata is not known and Fuchs and Igersheimer recommended examinations of the thyroid in nodular keratitis, H.'s findings are of interest.

C. Z.

FURTHER CONTRIBUTIONS TO DEGENERATIVE CHANGES OF THE CORNEA.—SEEFELDER, R. (*From the eyeclinic of Prof. H. Sattler in the University of Leipzig, Arch. f. Ophth.*, 90, p. 394), became convinced by his continued investigations on degenerative changes of the cornea, that aside of the so far known typical forms, as gerontoxon, marginal degeneration and dystrophy of the epithelium of the cornea, there is a group of cases, that is very near to the two former affections and in which the degenerative changes develop either exclusively, or in connection with a gerontoxon, at the center of the cornea. This central degenerative opacity of the cornea has

been observed only in older people, who stated that their vision constantly decreased in the course of the last few years, without inflammatory symptoms. The greyish white opacity consisted under the binocular loupe of small dots extending almost through the whole thickness of the cornea. The surface was smooth and reflecting, and the eyes were without irritation. Five cases are reported, which showed that the clinical aspect of the degenerative changes of the cornea is more variegated than so far supposed. The only treatment would be tattooing of the opaque portion with subsequent optical iridectomy.

C. Z.

GENERAL DISEASES AND THE EYE

EYE LESIONS AS A POINT OF IMPORTANCE IN DIRECTING SUSPICION TO POSSIBLE TRYPANOSOME INFECTION.—DANIELS, C. W., England (*Report of November, 1915, Meeting, Oph. Sect., Royal Soc. Med., Med. Press*, November 17, 1915). The writer pointed out the practical importance to be attached to the eye lesions as a diagnostic sign of infection with trypanosomes, inasmuch as, in some cases, they first determined the patient seeking medical advice. The common manifestation was in iridocyclitis, while a pronounced oedema of the lower lids was not rare. Choroiditis was less frequent. The incidence of the eye lesions stood in direct relationship with the severity of the infection. Thus, in Rhodesian trypanosomiasis the eyes were affected in 83.3 per cent., in Nigeria cases in 49 per cent., and in cases from Uganda and other parts of tropical Africa in 18.7 per cent. The mortality of the diseases in those three regions was, respectively, 100 per cent., 39 per cent., and 18 per cent.

C. H. M.

THE INCIDENCE OF RENAL RETINITIS IN SOLDIERS SUFFERING FROM EPIDEMIC NEPHRITIS.—MOORE, R. FOSTER, London (*The Lancet*, December 18, 1915). The author reports the results of the examinations of 119 soldiers recently returned from France and suffering from epidemic nephritis. The ophthalmic examinations were all made by the author.

In five of the 119 cases, renal retinitis was present. In seven others, small retinal hemorrhages had occurred, and the remaining 107 patients had normal fundi. The writer attaches no special significance to the small retinal hemorrhages present in the seven cases mentioned. In the case of the five men in whom retinitis developed, the average interval between the onset of symptoms of nephritis and the development of retinitis, as near as could be

judged, was seven weeks. In each of the men whose eyes showed characteristic hemorrhagic retinitis, the general symptoms were severe; and in general the more severe these symptoms, the more extensive were the changes in the retina. The average systolic blood pressure of 70 men with normal fundi was 143 mm., whereas that of the five men in whom retinitis developed was 180 mm.

It might appear from this report that retinitis may occur in a primary acute nephritis, but the writer does not believe this to be the case. He thinks that the acute disease has merged gradually into chronic nephritis, and it is in this group of cases that retinitis occurred. In four cases, in three of which retinitis was present, the blood serum was opalescent, indicating lipaemia. The backgrounds in these cases did not present the characteristic picture of "lipaemia retinalis," and the writer thinks that only in cases of diabetes does lipaemia attain a sufficiently high degree to give rise to the appearance of lipaemia retinalis.

J. M. W.

OCULAR STUDY OF A CASE OF LEONTIASIS WITH A SYNOPSIS OF REPORTED CASES SHOWING INVOLVEMENT OF THE EYES AND ADNEXA.—GREEN, JOHN, JR., St. Louis (*Amer. Jour. Ophth.*, October, 1915). A brief description of this rare and peculiar disease of which we know so little is given by the writer. He says that the especial interest to ophthalmologists lies in measures which have been suggested and carried out to ameliorate ocular complications. He speaks of one case in which Horsley removed the roof of the orbit as far back as the sphenoidal fissure, the major part of the great wing of the sphenoid, the upper part of the malar bone, and the lesser wing of the sphenoid, in order to relieve pressure on the optic nerve.

The writer gives a detailed report of a case which he has had the opportunity of studying. The patient is a female, born in 1873, the seventh of a family of 13 children. Both globes are very prominent so that the apex of each cornea is well in advance of the level of the nasal bridge. The pupillary distance is 81 mm. The right globe is pushed downward to a level of 4 mm. below that of the left. The palpebral apertures slant downward and outward, making an angle of about 15 degrees with a horizontal line. During the eight years the patient has been under observation, the globes have notably receded, the interpupillary distance has lessened and the motility of the eyes has increased. The bony bosses adjacent to the nose have decreased in size and the nasal cavities have so opened up that now nasal respiration is possible. Head-

ache and neuralgia, which formerly were very severe, have practically disappeared. The case reported is exceptional in that decided improvement which has taken place without surgical intervention. A synopsis is given of all cases which have been reported and which show involvement of the eye or adnexa. J. M. W.

HERPES ZOSTER OPHTHALMICUS.—CHANCE, BURTON, Philadelphia (*Ann. Ophth.*, October, 1915). The histories of six cases are reported, four of which had corneal involvement. One was a negro, the other five native white Americans. He enters into a very lengthy discussion of every phase of this rare disease. He emphasizes the importance of disease of the nasal accessory sinuses as an important etiological factor and points out that diseased teeth and gums may also play an important causal factor. The causation, however, in most cases is so varied and obscure that it is difficult to decide upon any one factor as of common occurrence. It is a disease essentially of advanced age. The average age of his cases being 52. It is the almost invariable rule that when the nasociliary branch of the ophthalmic division of the fifth is involved that the cornea will be invaded and probably the iris as well. When the eye is attacked it will occur at about the time that the vesicles appear on the eyelids.

When the oculomotor nerves are involved it is most commonly the third and the sixth is the next most likely to be attacked. In one of his cases there was paresis of the third. Paralysis of the facial nerve may follow or accompany herpes facialis.

He discusses at length the pathology of the nerve changes which it is inadvisable to attempt to abstract here. M. B.

ORBITAL OEDEMA.—WYNN, J. J., Louisville, Ky. (*Jour. Ophth., Otol. and Laryngol.*, September, 1915). This woman, aged 45, was passing through the menopause, was an asthmatic and had erythema nodosum on chest and abdomen. In the fall of 1913 she had her first attack of swelling, involving orbits, face and forehead. Four similar attacks took place before her vision began to fail. It was found that she was developing an optic atrophy which went on from bad to worse with every attack of orbital swelling, until only moving objects were seen. These attacks had all the clinical appearances of erysipelas and had it not been for the erythema nodosum would have been so diagnosed. M. B.

GLAUCOMA

GLAUCOMA AND OPTIC NEURITIS.—BOYLE, CHAS. C., New York (*Jour. Ophth., Otol. and Laryngol.*, September, 1915). This woman, aged 60, was taking about six or eight grains of morphine daily hypodermically. When the Harrison Law became operative the amount was reduced with the aim of a cure. Her husband was also a habitue and the reduction in his case resulted in insanity. She was much perturbed about his condition. She developed a binocular inflammation and was treated for some days for iritis by the use of atropin. When seen by the author she was found to have absolute glaucoma in each eye. An iridectomy was performed on each eye at once, which resulted in normal tension, when it was discovered that she had a marked optic neuritis. This she recovered from under treatment but passed over into the stage of atrophy with recovery of vision in one eye of 20 LXX. M. B.

GLAUCOMA: A NEW THEORY AS TO ITS CAUSE AND PATHOLOGY.—HARKNESS, C. A., Chicago (*Jour. Ophth., Otol. and Laryngol.*, December, 1915). The author's conclusions are as follows:

1. Glaucoma is due to a closing of the circumlental space or canal of the lens, thus blocking up the secretions in the posterior or vitreous chamber, this closure in most cases being the result of the lens becoming too large.

2. Closing of the canal of Schlemm is secondary and not the primary cause of increased tension.

3. Treatment to be effective must be directed towards the vitreous chamber and some means for permanent drainage of it must be found. If the author's theory is correct we fail to see why the action of eserine in contracting the pupil causes in many cases such prompt reduction of tension because it cannot have any effect upon the circumlental space. M. B.

CLINICAL LECTURE ON MASSAGE IN GLAUCOMA.—BRADBURN, ARTHUR ALLISON, Liverpool (*The Med. Press*, December 8, 1915). The author says that massage of the eye does not have the attention paid to it which he thinks it deserves. The effect obtained by massage of the eyeball may be due to a combination of three actions: (1) mechanical, that is a direct alteration in the shape of the eyeball and the position in the eye of its various parts; (2) a tonic action on the ciliary muscle; (3) a trophic action upon the intra-ocular circulation. The author lays it down as an axiom

that no case of chronic glaucoma should be operated on until the case has been carefully watched and treated by massage and myotics. He considers the effect of massage peculiarly beneficial in those eyes which have been under treatment by myotics and fail to respond as well as they did at first. He values the patient's opinion as to changes of tension between office visits in the eyes under treatment by massage administered by the patient.

He instructs the patient to look well down, to then rest the second fingers of both hands on the center of the eyebrow and to pass the tips of both ring fingers into the socket under the orbital plate of the frontal bone until they meet upon the globe. Both finger tips must remain in firm contact with the eyeball whilst one finger dimples it and this will slightly raise the other. By alternately pressing first with one finger and then with the other the intra-ocular pressure will be felt to diminish. The writer has not met with any contra-indications to the use of massage in glaucoma. He advocates it in cases of glaucoma secondary to iritis. J. M. W.

THE PRESENT POSITION OF SCLEROTOMY WITH ESPECIAL REFERENCE TO THE DANGER OF LATE INFECTION.—BUTLER, T. HARRISON (*Arch. Ophthalm.*, November, 1915, XLIV, 611), discusses the question of iridectomy vs. sclerotomy in acute and chronic glaucoma and concludes from his personal experience in 161 operated cases that the immediate results of sclerotomy do not show any superiority over iridectomy. The author states that one year ago his choice of operation would have been iridectomy for acute glaucoma and for mild cases of chronic glaucoma which were gradually losing ground under myotic treatment; sclerotomy for subacute cases and for long-standing chronic cases. Since that time the occurrence of eight cases of late-infection have changed the author's opinion. He discusses the relative advantages and disadvantages of each operation and concludes that sclerotomy is too dangerous in its remote effects to be the operation of choice in the majority of cases of chronic glaucoma, and that it should be reserved for those cases in which iridectomy has failed, for those cases where, owing to the shallowness of the anterior chamber, iridectomy is technically more difficult than trephining, and for patients whose iris is so atrophic that iridectomy is futile. W. R. M.

ACIDOSIS AND OEDEMA IN ITS RELATION TO GLAUCOMA.—SMITH, HENRY, Amritsar, India (*Arch. Ophthalm.*, January, 1916, XLV, 1), refers to the work on oedema by Dr. Martin H. Fischer, who believes that many oedemas, including glaucoma, are caused by acid-

osis. While Smith does not believe that acidosis is a cause of glaucoma, he regards the following as the most rational view yet advanced: That glaucoma is due to an autogenous toxin which has a special selective affinity for the vitreous, thus causing an oedema of that body. This oedema presses forward the lens zonula and iris and presses on the ciliary body, thus bringing into action the mechanical factors on which so much stress has hitherto been laid as the cause of glaucoma.

W. R. M.

GLAUCOMA FOLLOWING RETINAL DETACHMENT (DOCTORATE THESIS). — KEUKENSCHRYVER, NICOLAAS CORNELIS, finds that cases of detachment of the retina followed by glaucoma, are not so rare as one would suspect from the text books. He reports eight cases from Prof. Straub's clinic, all of which show that detachment can be followed by glaucoma. The most demonstrative are the cases with a great degree of myopia, because in such cases the myopia may be considered the cause of the detachment. The supposed course is as follows: The detachment of the retina occurs and gradually becomes complete: after some years an anterior capsular and cortical cataract develops. A posterior synechia may develop or the iridal margin may remain free. In the latter case the pigment epithelial layer of the iris is slowly pulled around the margin onto the anterior surface of the iris (ectropion uvae). A thin membrane of new-formed connective tissue, in which are numerous vessels, forms on the anterior surface of the iris. In the angle of the anterior chamber the most peripheral part of the iris becomes adherent to the posterior surface of the cornea. The longer the eye remains in situ, the higher the tension becomes.

In the eight cases reported, the retinal detachment was complete, adherent only with the optic nerve and the ora serrata. In only one case were rods and cones present. In the posterior third of the retina the nuclear layers could be recognized while in the anterior part retinal structure was not found. The pigment epithelium of the ciliary body was also detached at the ora serrata and was not replaced or regenerated as one would expect.

In three of the eight cases posterior synechia occurred while in four cases the ectropion uvae was present. In seven cases the lens was cataractous, both capsular and cortical. In six cases newly formed connective tissue was present at the place of the ora serrata. The closure of the angle of the anterior chamber is the most important finding. It was present in all cases. The tension was normal once, sub-normal twice and elevated in five cases. In the

five cases in which there was tension, the closure of the angle was complete.

The experimentation might be as follows: The retinal degeneration forms an irritating substance which comes into the lymph of the posterior and anterior chambers and produces a chronic inflammation around the angle of the anterior chamber. This might hold in secondary glaucoma, but in primary glaucoma we have a similar closure. Is the genesis the same?

The following investigations of Prof. W. M. de Vries regarding the closure of the angle of the anterior chamber are reported. Do the first changes appear in the anterior chamber which cause a "growing together" of the iris and cornea or do the first changes appear behind the iris and cause a "pushing forward" of the iris periphery after which the synechia develop? In twenty-four glaucomatous eyes, the peripheric closing of the angle was present. This closing may be complete where the lig. pect. is obliterated even to Descemet's M. or partial where a part of lig. pect. remains uncovered. The closure may be total, that is, along the entire circumference, or partial, so that the angle is free over a part of the circumference. The incomplete or partial may be considered earlier stages than the complete or total. In some cases inflammation could be demonstrated in the anterior chamber angle, in others the presence of a pathological substance to which the irritating action could be attributed, and in some cases a pushing forward of the iris periphery could be excluded with certainty. In regard to the latter, two cases of dislocation of the lens into the vitreous showed a slight "growing together" at the angle. In another case of dislocation of the lens into the vitreous by trauma, small particles of lens material crumbled away and found their way into the angle of the anterior chamber. A slight adhesion formed at this place. In two cases of glioma tumor cells were found in the angle. Three cases of sarcoma of the choroid, one with glaucoma, were examined. In one the A. C. was normal, in one an infiltration of mononuclear cells was seen in the angle. In one the eye was extirpated after the first attack of glaucoma; in a part of the angle a complete closure was found, part was free and there an infiltration in the wall of the canal of Sch. and the processus ciliares was found. In these three cases in which glaucoma is certain, it is preceded by inflammation of the angle.

In conclusion, one must consider glaucoma to be due to an inflammatory process of the lymph-outlets of the eye. A substance secreted in the eye, which, on leaving the eye, inflames the lymph-

outlets. Other places than the angle are the venae vorticosae and optic nerve. Many writers have observed changes in the latter.

DeV. believes that he has demonstrated the importance of the role inflammation of the lymph-outlets plays in the cause of glaucoma.

E. E. B.

CONTRIBUTIONS TO THE DOCTRINE OF GLAUCOMA. PATHOLOGICAL ANATOMY. ON PRELIMINARY AND EARLY STAGES OF CAVERNOUS DEGENERATION OF TISSUE IN HEMORRHAGIC AND SIMPLE GLAUCOMA.—GILBERT, W. (*From the eyeclinic of Prof. C. von Hess in the University of München, Arch. f. Ophth.*, 90, p. 36), reports his histological examinations of two cases of inflammatory hemorrhagic glaucoma and two cases of glaucoma simplex, in which the optic nerves in more or less extent behind the lamina cribrosa, and in one case in front of the lamina in immediate surroundings of the central vessels, were found infiltrated by a homogeneous mass, staining slightly blue with hematoxylin, and yellow according to van Gieson. According to Schmincke this reaction is characteristic of serum extravasation. Thus G. proved directly the existence of the maceration fluid (Schnabel), edema or stagnation fluid which was regarded by Fleischer and Fuchs as the cause of formation of cavernae. G.'s findings showed the following succession of phases: The process commences with an infiltration of the pre- and retrolaminar parts of the optic nerve by fluid. Then follows the stage of disintegration under the influence of the imbibing fluid, beginning with a swelling of the nerve fibres and followed by granular degeneration of the nervous mass. The detritus is carried away leading to cavernae or deep excavation without products of degeneration or fluid.

Two other cases are reported which showed, that an entirely different process, viz., hemorrhages into the tissues, may produce the same results. According to G., like in syringomyelia the cavernous degeneration of the optic nerve is not a nosological unity, but a terminal product from different processes, as glaucoma, myopia, traumatic lacerations.

C. Z.

ABDERHALDEN'S DIALYSIS IN GLAUCOMA AND SOME DISEASES OF THE OPTIC NERVE.—VON HIPPEL, E., Halle (*Arch. f. Ophth.*, 90, p. 198), examined 23 cases of acute and chronic glaucoma and four cases of diseases of the optic nerve with Abderhalden's method, combined with very careful clinical examinations by Dr. Mohr, as palpation of the neck, percussion of the sternal region, lymphocytosis, and examination of the mediastinum with Roentgen rays.

Thyroid and thymus were absolutely predominating, while positive reactions of the other organs were observed only exceptionally. Eleven positive reactions concerned the suprarenal glands and the pancreas, which are not accessible to clinical examinations, if not seriously affected, one the liver with diffuse hyperplasia and one the ovary. The serological findings of the thymus were clinically especially well supported, also, if thyroid and thymus are considered as a unity. The results were a splendid proof for the value of Abderhalden's method, by which it is possible to detect a perfectly latent clinical condition, that in most cases was not even suspected. It is of especial value for the diagnosis of affections of the thymus. The very frequently found lymphocytosis is certainly not without relation to the changes of these organs. A persistence with dysfunction of the thymus and palpable hyperplasia of the thyroid is according to literature and v. H.'s findings very frequent and may be compatible with the ordinary conception of health, as they surely are often not recognized. v. H. considered his investigations only as preliminary without formulating a theory. He found in his cases, at least in glaucoma, abnormal anatomical and serological conditions. In future one has to see, whether also functional disturbances can be disclosed by all methods so far at our disposal, which in the affections of the optic nerve partly existed.

C. Z.

FURTHER INVESTIGATIONS ON KERATOCONUS WITH ABDERHALDEN'S METHOD OF DIALYSIS.—VON HIPPEL, E., Halle a. S. (*Arch. f. Ophth.*, 90, p. 173), reports on his serological examinations of 34 cases of keratoconus; 6 showed negative reactions, 20 multiple cell destruction of the thyroid, 7 only positive reaction of thymus, 15 combined reaction of thyroid and thymus in the same case. Out of the other organs the suprarenal glands reacted most frequently positive. Thus in the majority of cases Abderhalden's method proved disturbances of internal secretion, but there were some in which the reaction was negative and the clinical examination failed. This latter fact does not exclude that at the time, when the keratoconus developed, a disturbance of internal secretion existed, and it may be possible that in slight anomalies the defensive ferments in the serum may be lacking. This may be decided if cases with negative reaction are reexamined at certain intervals. So far it cannot be asserted that a disturbance of internal secretion was regularly proven, but the idea of Siegrist of bringing keratoconus in connection with disturbances of internal secretion

has been materially supported by these examinations with Abderhalden's method.

C. Z.

INJURIES

NERVOUS SYMPTOMS FROM CONTUSION OF THE EYE.—WILLIAMS, E. R. (*Trans. Am. Oph. Soc.*, p. 40, 1915). He divides and discusses these traumas and their consequences into: (1) surgical shock at the time of the accident, its relation to cerebral concussion, its exaggeration by psychic influences, as, for instance, the emotions of fear, anxiety, etc.; (2) psychic shock of the eyeball, sub-divided into two classes: (a) shock causing reduced vision without permanent damage of the retina; (b) shock effecting serious retinal damage, with permanently reduced vision; (3) traumatic delirium, often a complication of head injuries, eye operations, etc.; (4) traumatic neuroses, tending to incapacitate the individual from quickly resuming work, and necessitating special after-treatment; (5) permanent damage to different internal parts of the eye.

In *characteristic shock symptoms* the patient, upon being hit on the eye, usually staggers and sinks to the ground, where he remains dazed, but conscious. In several instances the patient loses consciousness several minutes. He groans or cries out in anguish. Severe pain in the globe may come instantly, but sometimes is delayed an hour or more; with severe blows it persists one or several days. The individual feels faint or chilly, looks pale and haggard, is nauseated, and often vomits. Being much weakened, he staggers if he attempts to walk. The pulse is weak and rapid, due to the decrease of blood-pressure. These shock symptoms are usually gone after the first night's sleep. The disturbing dreams occurred in two of these cases. The prostration, both mental and physical, often will last several days.

Psychic shock of the eyeball was studied by von Merz (*Klin. Monatsblätter für Augenheilk.*, Beilageheft, 1907), who had many opportunities to treat eye patients during the Russo-Japanese war. The most interesting contusion injuries of the eyes were caused by air concussion following the bursting of shells. He divided his cases into two classes: (A) psychic shock; (B) a paralytic dilatation of the vessels between the retina and the choroid (Beck's theory).

A. If shock alone is present, there occurs a molecular change in the structure of the retina, but one which is neither macroscopic nor microscopic.

B. If transudation of fluid from the choroidal vessels occurs

(even in small amounts), the delicate retinal elements will be more or less destroyed. Ordinarily, there is no ophthalmoscopic change seen. Vision may never be regained, and, later, an atrophy of the optic nerve will be seen.

Williams further says that in the *traumatic neuroses of globe contusions*, if the injury is severe enough to have the patient admitted to hospital, it seems best to him that he shall be kept quietly in bed, at least one day—just as cerebral concussion cases are handled. Worry over the condition of his eye and the doubt in his mind about the final outcome will often be enough to start true traumatic neuroses. An excellent plea for careful watching of all such accident cases during convalescence has been made by J. J. Thomas (*Modern Treatment of Nervous and Mental Diseases*, p. 439). He believes that those who treat contusions of the eye should realize that a great deal can be done to prevent the development of neuroses by the proper care of the patient during the late convalescence. After the healing of his wounds or after the first shock symptoms have subsided it is not good practice to discharge the patient and tell him he is fit to resume work. The individual does not always feel cured; he is still nervously weakened, and consequently timid of serious complications which may affect the restoration of his full eyesight. The effect of attempting to resume his duties, especially if they are intellectual, is to increase the remaining symptoms. It frequently confirms the fear he has, perhaps unacknowledged to himself, that he never will be able to use his eye and do good mental work again. This fear sets in motion very frequently the chain of symptoms known as traumatic neuroses. The patient should be kept away from too solicitous friends, who, by frequent allusions to his recent accident, tend to keep active a chain of thought which might lead easily to further neuroses. The patient needs repeated assurances that his injured eye is regaining its normal functions. This will do more than any other one thing to restore his confidence.

C. A. W.

A CASE OF ISOLATED TRAUMATIC RUPTURE OF THE POSTERIOR LENS CAPSULE.—EBELING (*Arch. f. Ophth.*, 90, p. 121). A man, aged 51, showed after a severe blow on his left eye a horizontal rupture of the posterior lens capsule, circumscribing a central oval flap with opaque margins, the capsule presenting horizontal undulating folds. The fundus was normal, V. 6/18. The next day very fine opacities appeared on the posterior surface of the cornea, which subsided after five days. Now diffuse fine opacities devel-

oped on the posterior surface of the lens and also in the vitreous. The cataract became total after six months and was extracted. As the affection is very rare, the few cases published are quoted. All developed cataract, but rather slowly, probably due to the fact that the more tenacious fluid of the vitreous does not act as powerfully on the lens fibres as the aqueous. C. Z.

COMPLETE LEFT LATERAL HEMIANOPSIA WITH GLYCOSURIA AS A RESULT OF SLIGHT TRAUMA.—WOODRUFF, F. E., St. Louis (*Ann. Ophth.*, October, 1915). A well preserved man in apparent good health slipped but regained his balance by strong muscular effort and shortly after noticed a defect in his vision which proved to be a left lateral hemianopsia with preservation of central vision. A few days prior to this his urine had been carefully examined and no sugar was found. A few days after large quantities of sugar were present. No motor or sensory disturbances were discoverable. The sugar in the urine gradually lessened and entirely disappeared in about two months' time. Nine months later there was a slight change in the hemianopsia, light perception had begun to return in the left upper quadrant.

A lesion confined to the cuneus or to the gray matter immediately surrounding it on the mesial surface of the occipital lobes produces homonymous lateral hemianopsia without motor or sensory symptoms. M. B.

CONTRIBUTION TO INJURY OF THE EYE BY GLARING.—BIRCH-HIRSCHFELD, A., and STIMEL, Koenigsberg (*Arch. f. Ophth.*, 90, p. 138), reports 13 cases of glaring, caused by electric light from short circuit. All, except one who was not as much exposed, presented relative pericentral and paracentral scotomas as a constant symptom. The nasal halves of the retinæ were more frequently affected than the temporal halves, apparently due to the greater extent of the temporal visual fields, the temporal half of the retina being better protected by the orbital margin and the root of the nose. In some cases central vision was impaired although ophthalmoscopically no cause for it could be found. It may have been due to the initial violent irritation of the conjunctiva with lacerimation and photophobia. A positive central scotoma, which is the rule after glaring by sunlight, was not found in any of the cases. But there was undoubtedly a striking identity of both phenomena with regard to the transient relative scotoma for colors. This points to a common cause which can only be attributed to the

luminous rays, as Birch-Hirschfeld showed that in glaring by sun the ultraviolet rays have no essential etiological importance. In glaring by short circuit and by sources of light abundant in ultraviolet rays these cannot be neglected, as B. found in experiments on himself. A large amount of these penetrates the lens and is an essential factor in damaging the retina. Therefore it is possible that visible and invisible rays jointly caused the scotoma since in B.'s autoexperiments the visible rays alone did not produce it. The ring scotoma, although transient completes the complex of symptoms of electric ophthalmia. With regard to its anatomical base, B. is inclined to assume that the organ of color perception, i. e. the so-called visual sensory substance is transiently damaged by glaring.

Another case is reported with cataract after severe burning by short circuit (110,000 volts) and loss of consciousness. The clinical aspect of the opacity of the lens showed a great resemblance to cataracts by lightning and in glass blowers.

The next case was caused by glaring by the sun during work. The positive scotoma corresponded to the size of the image of the sun, and caused a considerable impairment of sight persisting for 5 years, so that an improvement could hardly be expected.

C. Z.

ON WAR INJURIES OF THE VISUAL ORGAN AND THE OCULISTIC ACTIVITY IN THE FIELD HOSPITAL.—GILBERT, München (*Arch. f. Aug.*, 80, p. 41), reports on different kinds of injuries. G. performed exenteration in all cases of total destruction and double perforations of the eyeball, if the sclera was not lacerated to such a degree, that its preservation would have been of no advantage. Injuries caused by pressure from explosion were a special peculiarity of the employment of mines in the war. Excluding fatal injuries of the skull, G. observed 43 cases, 31 by tangential and other shots through grenades and pieces of mines, 10 by infantry rifles and 2 by shrapnels. In 7 choked disc occurred, 2 of which presented a swelling of 6.00 D. Both were injuries of the occiput by grenade splinters, showing during an observation of 8 weeks a slowly progressing improvement of all symptoms, also of the choked disc. One of these presented on the side of the greater swelling of the disc in its immediate surrounding hemorrhages and foci of degeneration in the retina, which G. attributed to stasis. In some injuries of the cranium by mine splinters G. observed redness, indistinct borders of the disc and tortuosity of the engorged vessels without marked prominence of the disc and without symp-

toms of intracranial pressure, i. e. the picture of optic neuritis rather than of choked disc. After a revision of the wound, removal of pieces of bone or opening of a suppurating hematoma the inflammatory symptom at the disc rapidly subsided. Next to the ophthalmoscopic changes of the disc, the most frequent complication of gunshot injuries of the skull was transient infranuclear paralysis of the abducens.

G. emphasizes the necessity of refractometric examinations of the soldiers and the prescribing of glasses. 24 of those examined for visual disturbances showed hemeralopia. In some it was congenital, in 13 with good vision after corrected refraction the known causes could be excluded, especially malnutrition and affections of the liver. Their dark adaptation was retarded or abolished.

C. Z.

INSTRUMENTS AND METHODS OF EXAMINATION

THE USES OF HIGH FREQUENCY CURRENTS IN SPECIAL WORK.—LINNELL, E. H., Norwich, Conn. (*Jour. Ophth., Otol. and Laryngol.*, October, 1915). The apparatus he uses consists of a D'Arsonval solenoid and Oudin resonator, energized by a twelve inch coil and Leyden jar condensers. Vacuum tubes may be used advantageously in interstitial keratitis to hasten absorption of exudates and for clearing of recent nebulae. They are useful in sluggish ulcerative conditions of the cornea. A very mild current only should be used with a low vacuum electrode and for not more than one or two minutes. The tube is applied over the closed lids. The treatment is also beneficial in marginal blepharitis, induration of lid border following hordeala chalazia, etc.

In lupus and warty growths the fulguration spark is valuable.

M. B.

HIGH-FREQUENCY IN SPECIAL PRACTICE.—SMITH, WM. H., Cincinnati, Ohio (*Jour. Ophth., Otol. and Laryngol.*, October, 1915). He uses the D'Arsonval current with a medium tube. He thinks its value is dependent upon a passive hyperaemia which it produces. He finds it of value in asthenopia after correction of the refractive error, in keratitis, iritis, glaucoma, corneal ulcer and interstitial keratitis. He is quite confident that incipient cataract cannot only be arrested but much improved.

M. B.

ELECTRIC MAGNET IN EYE WORK.—DENMAN, J. O., Toledo, Ohio (*Jour. Ophth., Otol. and Laryngol.*, October, 1915). He seems

to think the giant magnet is a more satisfactory instrument than the spud for the removal of steel embedded in the cornea such as filings and other small particles. He also approves of the magnet as a diagnostic agent as to whether the eye contains a foreign body. He does not think the steel can be removed through the wound of entrance if the entrance is complete. A foreign body at large in the eye should be drawn around the lens into the anterior chamber, in this he agrees with Habb.

M. B.

THE ELECTRIC OPHTHALMOSCOPE.—MYERS, DEAN W., Ann Arbor (*Jour. Ophth., Otol. and Laryngol.*, October, 1915). He regards the electric ophthalmoscope as destined to replace the ophthalmoscope used with reflected light. It is easier and more convenient to use and for people lying in bed it is almost indispensable.

M. B.

THE U-SHAPED ELECTRIC MAGNET.—FETTE, GEO. T., Cincinnati (*Jour. Ophth., Otol. and Laryngol.*, October, 1915). The author has devised a U-shaped magnet which resembles in form the small horse-shoe magnet. He contends that the lines of force of a magnet become greatly augmented as the two poles of the magnet approach each other and that the direction of the pull can be perfectly controlled when the eye containing the foreign body is placed in this path. His magnet is so constructed that the pole pieces can be adjusted from contact to several inches.

M. B.

IRIS

HISTOLOGICAL FINDINGS AFTER IRIDOTOMY.—VERHOEFF, F. H., Boston (*Arch. Ophth.*, January, 1915, XLV, 5), gives the histological findings in a glaucomatous eye on which an iridotomy had been done. From his microscopical findings, and the clinical course of the case, the author concludes that for a certain time after operation the pupillary margin of the prolapsed iris was entirely outside the corneoscleral wound. While this condition obtained, drainage took place. Gradually the traction of the sphincter pulled the pupillary margin downward until it came into contact with the anterior lip of the wound and adhered to it and cut off drainage.

The author believes that it would be advantageous to include the sphincter in the piece of tissue excised.

W. R. M.

GONORRHEAL IRITIS.—KEPFELER, E. (From the eye clinic of Prof. G. von Schleich in the University of Tübingen, *Klin. Mon.*

f. Aug., 54, p. 307), gave a splendid collective report from literature on the pathogenesis, clinical aspect, prognosis and treatment of gonorrheal iritis, in connection with 5 cases of his own, in which there was no doubt about the etiological diagnosis. Characteristic of gonorrheal iritis are the sudden onset with violent irritation and intense pain, a gelatinous coagulating exudation in the anterior chamber, favorable course, but inclination to relapses. Also the ciliary body and chorioid are mostly diseased, as proven by the opacities of the vitreous in the severe cases. It is very rare in acute gonorrhea. Most frequently affections of the joints appear first as a sign, that the gonorrhea has become a general disease. The diathesis, the whole physical constitution of gonorrheal individuals may favor the spreading of the endothelial membranes of the body. Thus the still perfectly occult rheumatic constitution or the, by any noxious influences lowered, resistance of the organism may play a part. Whether especially virulent strains of gonococci give rise to the metastases or whether in gonorrheal iritis a mixed infection, e. g. by staphylococci, occurs, is still undecided.

Keppeler considers arthigon, a polyvalent vaccine, manufactured according to the directions of Burck and Schering from numerous strains of gonococci, as an important diagnostic means for gonorrheal iritis. In perfectly latent gonorrheal affections injection of 0.02 arthigon rekindles the old symptoms with abundance of gonococci.

Gonococcal vaccine or antigonococcal serum, may according to the reported favorable results, be indicated as specific therapy.

C. Z.

TUBERCULOSIS OF THE IRIS AND SHEATHS OF THE OPTIC NERVE OF CATTLE.—KOHN, K. (From the eye clinic of Prof. A. Peters in the University of Rostock. *Klin. Mon. f. Aug.*, 54, p. 307), gives a very good literary review on bovine tuberculosis of the iris and optic sheath, with abstracts of the 10 cases of Manleitner, and the anatomical description of the eyes of a cow examined by himself. One part of the iris, excepting the sphincter portion, was converted into a rugged tumor, occupying the whole space between equator and anterior pole of the lens and the posterior corneal surface, involving the ciliary processes. The tumor was divided into two oval formations by a kind of septum. Their marginal zones were very much infiltrated and contained at some places vessels and giant cells. These were especially numerous toward the pupil, while the cellular infiltration was predominant in the ciliary body and the root of the iris. The tumor had arroded the lens capsula

and had spread into the intracapsular space. Like in the cases of Mauleitner the tuberculosis of the iris was considered as primary.
C. Z.

TO THE KNOWLEDGE OF THE IRIS IN CONGENITAL MELANOSIS.—STEINER, L., Lausanne (*Klin. Mon. f. Aug.*, 54, p. 193), observed in a Javanese woman, aged 20, an apparently congenital melanosis of the iris of the left eye. The dark brown iris showed no ruffles, ridges or crypts and no circular sulcus, but was covered with fine flat roundish wartlike elevations. There were no signs of a former inflammation or traumatism, especially no synechiae, and the pupillary reaction was normal, but there was incipient cataract in this eye. S. has not seen a similar case in his large practice of over 20 years, at Java.
C. Z.

MEASURING INVESTIGATIONS OF THE COMPARATIVE PHYSIOLOGY OF THE PUPILLARY MOVEMENT.—HESS, C., München (*Arch. f. Ophth.*, 90, p. 382), describes his differential pupilloscope, manufactured by C. Zeiss, Jena, with which it is possible to measure the pupillomotor differential sensibility of the human eye, i. e., minimal differences of intensities of light, which in normal and diseased eyes suffice for eliciting a noticeable change of the width of the pupil. Hess also shows how the apparatus may serve for the investigation of important questions of comparative color doctrine. He gives a condensed survey over his experiments of measuring with an accuracy, so far not supposed possible, values of the pupillomotor stimulation of colored glass lights of relatively high intensity in a series of different animals under uniform conditions, especially equal intensity and adaptation. The results confirm and broaden the conditions previously found by Hess in birds and cephalopodes and furnish new unexpected facts on the visual qualities of various mammals.
C. Z.

MATERIA MEDICA AND THEREPEUTICS

THE MYDRIATIC ACTION OF DEXTROHYOSCYAMIN.—TERRY, ROBT. AND WIENER, MEYER, St. Louis, Mo. (*Annals Ophth.*, October, 1915). The writers give the results of experiments with the local application of dextrohyoscyamin in man. Cushny had previously reported the results of experiments in animals with this agent; he stated "that atropin has been shown to be a mixture of equal parts of natural, or laevohyoscyamin, and that of its dex-

trorotary isomer, which differs from the ordinary or laevohyoscamin, in the way it rotates polarized light."

It was found that a one-half per cent solution of dextrohyoscamin instilled in the human eye caused a dilatation of the pupil to a width of from five and one-half millimeters to eight millimeters in about forty minutes, lasting on an average twelve hours before returning to the original size; also that the accommodation was disturbed very slightly in most cases, and in some cases not at all. Accommodation was affected for a much more considerable period and to a much greater extent in some individuals than others: this was due to the solution not being perfectly fresh, the dextrohyoscamin rapidly changing to the laevorotary form when in solution, and affecting the accommodation like atropin. This was corrected by keeping a one-fourth grain of dextrohyoscamin powder in a one dram bottle, and filling the bottle with water just at the time of using. The drug is now put up in tabloid form ready to introduce into the conjunctival sac: this form is stable and effective although it causes severe burning sensation for a minute. No detrimental effects on the eye have been observed in a series of several thousand patients in whom it was used for examination of the fundus and for the shadow test: it has the advantage over euphthalmine of dilating the pupil much more quickly and effectively.

C. H. M.

LOCAL ANESTHESIA IN EXENTERATION AND ENUCLEATION OF THE EYEBALL WITH SOLUTION OF NOVOCAIN.—ILLIG, H. (From the eye clinic of Prof. C. von Hess in the University of München. *Arch f. Aug.*, 80, p. 54), describes the method used at the clinic and tested in 70 cases. It deviates from that of Seidel and Gebb, published in von Graefe's Archiv and reviewed in Ophthalmology, who use 1% and 4% novocain and greater quantities of the solution. I. says that it is superfluous to add to the injections of the ciliary ganglion subconjunctival, parabulbar or intrabulbar injections. 0.3% novocain is sufficient in combination with sulfate of potash in the formula: novocain 0.0125, sulfate of potash 0.02, suprarenin (1:1000) 2 drops, solution of sodium chloride (0.9:100) 5.00. 45 minutes before the operation a subcutaneous injection of scopolamin or morphin is made in very excited persons. 25 to 20 and 15 minutes before the operation a drop of a 5% solution of cocain is instilled into the conjunctival sac. 12 minutes before the operation 1.50 cm. of the 0.3% solution of novocain with sulfate of potash are injected from the temporal and nasal sides of the conjunctival sac behind the eyeball, which is described in detail.

There was no deleterious effect of the injections either before or after the operations. C. Z.

EXPERIMENTAL CONTRIBUTIONS TO CAUTERIZATION OF THE CORNEA BY STEAM.—WESSELY, K., Würzburg (*Arch. f. Aug.*, 80, p. 1), reports on the experiments on rabbits, made at his instance by Hayano for supporting and broadening the clinical results with steam cauterization, devised by Wessely in 1912. Comparing the macro- and microscopic results of cauterization by alcohol steam (78°C) and steam with wounds made by cutting off a calotte of the cornea and wounds made by the galvanocautery, W. found that the damage to the corneal substance by steam is much less than by the galvanocautery, that the corneal surface reaches much more rapidly its normal level and that the steam cauterization leaves much slighter opacities. The final results differ from those made by cuts and actual cauterizations by showing with the keratoscope no irregularity of the surface, which after burns is permanent. Hence the injury through vaporization with regard to the optical effect is less than by the galvanocautery. Although the action of the temperature of the steam into the depth is considerably stronger, the tissue is less damaged. A transudation into the parenchyma of the cornea takes place which explains in which fashion the steam cauterization must influence pathogenic germs also in the deeper corneal strata. As no real loss of substance but a slow necrotic destruction of the uppermost corneal lamellae follows the vaporization, no supplanting cellular tissue is produced and the microscopic picture of a scar, as after cuts and burns, is lacking.

In studying the greater possibility of becoming infected of cuts, burns and the defects of the cornea after vaporization, W. found that cuts became infected within the first 24 hours after inoculation of the conjunctival sac in every case. The galvanocautery eschar gave a protection for the first 2 hours, while the defects after vaporization immediately after the operation are more easily infected. The phenomena are entirely different if the infection occurs in the later stages. After about 30 hours the possibility of infection of the steam lesions seems entirely abolished, while in galvanocautery wounds the possibility of infection commences at about the second hour and constantly increases, so that violent ulcers may be created even in the 30th hour. This shorter period of the possibility of infection of steam lesions is due to the more rapid regeneration of the epithelium.

The comparative investigations on the therapeutic effect of steam cauterization and galvanocauterization in corneal ulcers artificially

produced by bacillus suisepiens (as in rabbits it is very difficult to obtain progressive ulcers of the cornea by pneumococci), yielded 83.3% positive results after steam, 50% after galvanocautery, illustrating the greater superiority of vaporization over galvanocauterization, in concordance with W.'s clinical experience. C. Z.

ON THE TRANSITION OF UROTROPIN INTO THE AQUEOUS AND THE DISSOCIATION OF FORMALDEHYDE.—REMELE, J. (From the eye clinic of Prof. H. Sattler in the University of Leipzig, *Arch. f. Ophth.*, 90, p. 426), reports on his experiments on rabbits, in which he found, that urotropin, injected intravenously, at once appears in the aqueous and soon reaches the highest concentration, i. e. from 1/1000 to 1/5000 after injecting 2 grams of a 10% solution. This remains for about 4 hours and gradually decreases. Formaldehyde is dissociated about $1\frac{1}{2}$ hours after injection, and is still found after 19 hours. Its quantities are very small.

C. Z.

THE SINUSOIDAL CURRENT IN OCULAR THERAPEUTICS.—COLEMAN, W. FRANKLIN, Chicago (*Jour. Ophth., Otol. and Laryngol.*, October, 1915). He claims that this current has a decomposing effect. He makes use of it in the treatment of optic nerve atrophy. The object being to cause mild stimulation and that the nerve flash shall be not painful. The rapid sinusoidal causes a constant mosaic light impression without the least discomfort. He claims improvement in 64% of his cases of atrophy of the optic nerve. He reports a number of cases to substantiate this claim. The treatment must be continued for a number of months. M. B.

PRINCIPLES OF ELECTRO-THERAPEUTICS.—DIEFFENBACH, WM. H., New York (*Jour. Ophth., Otol. and Laryngol.*, October, 1915). In this issue of the Journal O. O. and L. there appears a symposium on electro-therapeutics. This is the leading article and deals in a very comprehensive manner with the well established principles of electro-therapy. The author excuses himself from the class of electro-therapeutic enthusiasts, but is quite confident that electricity is not used as much as it should be, and that the reason why some men fail to get results is because they do not know how to use it. It is quite necessary that in selecting a current, say the constant, alternating, sinusoidal, static or high-frequency, that the appropriate one be chosen for the condition to be treated. In the use of the constant current the polarity may improve or aggravate the condition. In the use of the high-frequency current the choice

is to be made between the D'Arsonval, Tesla and Ondin and here again the choice of hard or soft vacuum tubes is important. He makes it quite apparent that the use of electricity is far from simple and that if we are to use it without almost certain disappointment it is essential to study its application very carefully.

M. B.

THE TREATMENT OF KERATITIS AND ITS SEQUELAE BY THE HIGH-FREQUENCY CURRENT.—BOYNTON, W. E., Chicago (*Jour. Ophth., Otol. and Laryngol.*, October, 1915). He says the high-tension, high-frequency acts directly upon capillary circulation, relieving congestion and blood stasis, lessens chemosis and aids in clearing blocked lymph spaces of the cornea. Through its oxidizing power it hastens and augments the disintegration of the devitalized cells and organized exudates and filtrates, while by increasing osmotic action it expedites their removal. He uses low vacuum tubes when the process is active and as the process subsides a tube of high vacuum is substituted and the time of treatment increased to from seven to fifteen minutes. The treatments are repeated twice a week to begin with and the frequency lessened as improvement progresses. No case of corneal blindness should be considered hopeless in which the cornea is not practically destroyed. The more dense and extensive the opacity the longer must be the course of treatment, but even if three or four years elapse before serviceable vision be secured, it is well worth the effort. Of the lesser degrees of opacity fully 90% will yield to treatment.

M. B.

MY EXPERIENCES WITH ELECTRO-THERAPEUTICS IN OCULAR DISEASES.—THOMPSON, LE ROY, Chicago (*Jour. Ophth., Otol. and Laryngol.*, October, 1915). He has great respect for the high-frequency current and uses it successfully in catarrhal conditions of the conjunctiva, inflammation of the retina, iritis, atrophy of the nerve, corneal ulcer, trachoma and blepharitis. He also uses it in cases of muscular asthenopia and Bell's palsy.

M. B.

STATIC ELECTRICITY IN THE TREATMENT OF THE EYE, EAR, NOSE AND THROAT.—YALE, A. W., Philadelphia (*Jour. Ophth., Otol. and Laryngol.*, October, 1915). The static machine produces the most satisfactory high-frequency current. He finds it of value in ulcers of the cornea and all external eye injuries.

M. B.

MISCELLANEOUS

SOAP AND WATER AND OPTICIANS.—MAY, CHARLES H., New York, N. Y. (*Ophth. Record*, May, 1914). One can readily imagine a route of infection from the eye of one patient to his lenses, to the fingers of the optician, and thence to the frames, lenses and eyes of a second individual.
G. I. H.

THE OCULIST AS INTERIOR DECORATOR.—WIPPER, OTTO, Chicago, Ill. (*Ophth. Record*, April, 1914). The author believes that symptoms like headache, vertigo and others which are frequently allied with eye affections, will in many cases be greatly relieved after the aspect of a room has been changed from a disturbing one to one that is harmonious.
G. I. H.

SOME PRACTICAL POINTS IN EYE WORK.—DUANE, ALEXANDER, New York (*Arch. Ophth.*, September, 1915, XLIV, 481), gives some practical and useful points on the use of argyrol, copper sulphate, measurement of the pupil, method of determining the reaction of the pupil, measurement of interpupillary distance, measurement of the angle of convergence, examination of the corneal surface, and method of mapping scotomata.
W. R. M.

OPHTHALMOSCOPIC OBSERVATIONS FROM A RESERVE HOSPITAL ON THE SOUTHWESTERN FRONTIER.—LOWENSTEIN, A. (Prag, now in the field, *Muench. Med. Woch.*, December 21, 1915). While the front was rapidly changing with a constant outflow of freshly wounded soldiers and a constant influx of new men and old wounded men, fit to return to the line of battle, the eye injuries comprised from 2.3% of all seen. But in a reserve hospital on the Italian frontier, L. was enabled to build up an eye department and found that among the 1,900 surgical cases treated during a period of 3 months, there were 239 cases that came under his special department. This was 12.58%. Over half of these were injuries, involving one or both eyes, mostly due to splinters from rocks or to flying iron or brass from shrapnel or hand grenades. For the removal of magnetic foreign bodies, L. utilized the fixed magnet from the ignition magneto of a heavy truck, with inverted U tips bolted on. This worked perfectly satisfactory. But he found that the ordinary field X-Ray outfit of insufficient strength to be of value in localizing intra-ocular foreign bodies.

A good deal of space was devoted in the article to a warning against too rapid enucleation of an injured eye by the field sur-

geons. L. emphasizes the fact that an injured eye does not need to be enucleated as a preventive against sympathetic ophthalmia for at least two weeks and this time suffices for the transportation of the patient to a reserve hospital where an ophthalmologist may be found. His specialized knowledge saves many an eye that would be condemned by the regular army surgeon.

The many advantages of the ophthalmological department of the reserve hospital were discussed briefly. He mentioned the splendid results of his treatment of corneal ulcers with the tincture of iodine (5%). A good deal of refraction came to light among the soldiers that under ordinary circumstances would be rejected for insufficient vision, but who were accepted during times of stress.

H. S. G.

OPHTHALMOLOGICAL EXPERIENCES DURING WARTIME. — UITHOFF, W., Breslau (*Berl. Klin. Woch.*, January 3, 1916). The soldiers receiving eye injuries during the fighting on the Polish frontier were sent to the Breslau clinic and U. publishes his experiences with 600 of these hospital cases. He divides them in (A) non-traumatic cases and (B) traumatic with the numerical relationship of 1:1.5.

(A)

1. Keratitis dendritica. Practically 25% of the cases of class A came under this heading, giving a far higher frequency than during peace times. Probably, the intense nervous strain was an etiological factor. In severe cases if the involved area was eccentric, he cauterized frequently and vigorously, thus at times limiting the extent of the process.

2. Ulcus serpens. Only 1%. The infrequency was probably due to the youth of the combatants and their subsequent clear tear passages.

3. Conjunctivitis. Less than 5% of this class were trachomatous, and these were mostly old cases with acute exacerbations. Only two fresh cases appeared. U. does not believe that there is any danger of a trachoma epidemic following this war, as in the past, partially due to a decrease in the contagiousness of the disease. Only one case of gonorrheal conjunctivitis appeared among the 600 cases under observation.

4. Iritis. 8% of the non-traumatic cases came under this heading, one-third of them being of unknown etiology. Of the remainder, one-third were due to syphilis and one-third to rheumatism. This reverses the etiological figures of peace times, when 50% are due to syphilis or gonorrhea.

5. Hemeralopia. 3% of the total. One-third hereditary; one-third the result of organic disease of the retina; and one-third idiopathic.

6. Nystagmus. 3.5%. About one-third of these came under the class of miners' nystagmus.

7. Lack of reaction of pupil to light, but good reaction to convergence in 2% of the cases. Always due to lues or tabes.

8. One chorioidal sarcoma and one carcinoma of the tear sac.

(B)

252 cases of the 600 came under the traumatic class. 46% of the eyes seen in this class became totally blinded—10% retained a vision of less than 0.1; and 44% retained more or less useful vision. Enucleation was performed in 35% of the cases. The majority of the deep perforating injuries were lost, although successful extraction of the foreign bodies saved a few eyes. An unusual type of injury resulted from lead bullets striking rocks, etc., and causing a lead spatter. Small particles of lead could be found in the external portion of the eye and frequently in the internal portions, leaving no site of penetration. Such eyes were usually lost by chorioidal suppuration of a chemical nature.

(C)

Orbital injuries. 11%. 83% of this class lost the eye. Although small pieces of foreign bodies may be left in the orbit, large pieces must be removed.

(D)

Occipital injuries with hemeralopic visual fields. Reported in detail in the *Klin. Monatsbl. F. Augen*, 1915, Vol. 55. 15 cases in this class and the majority, although blind at first, usually recovered useful vision.

(E)

Functional nervous visual nervous disturbances. Only 2%. The majority of these were hysterical blepharo-spasm. There were two cases of hysterical amblyopia with concentrically contracted visual fields. Much to the honor of the German army, simulation occurred in only $\frac{1}{2}$ to 1% of the cases.

(F)

3 cases of methyl alcohol amblyopia.

(G)

1 sympathetic paralysis.

(H)

Injury of the trifacial nerve in one or more branches rather frequent.

(I)

Large number of plastic lid and conjunctival operations with uniformly good results.

(J)

6 deaths among the 600 cases. One due to typhus, one to nephritis, and four as the result of injury (meningitis, etc.).

(K)

32 cases of bilateral blindness. 50% of these were due to rifle shots and 20% to transverse shots through both orbits. Using these statistics as a basis, U. figured that there were about one thousand cases of bilateral blindness to date in the German army.

H. S. G.

LUMBAR PUNCTURE AND EXAMINATION OF THE SPINAL FLUID IN AFFECTIONS OF THE EYE.—AYER, JAS. B., Boston, Mass. (*Arch. Ophth.*, January, 1916, XLV, 9), presents the results of examination of the spinal fluid in a group of cases of interest to the neurologist and ophthalmologist and the effects of treatment in certain syphilitic cases. He urges the importance, to the ophthalmologist, of differentiating more carefully, by means of the spinal fluid, types of inflammatory and degenerative disease of the nervous system.

The paper is based in the examination of 160 cases. The cases studied were external ocular palsies, primary optic atrophy, optic neuritis and choked disk, and abnormal pupils. Of 40 cases of external ocular palsies, only five showed normal spinal fluids; of 44 cases of primary optic atrophy 12 showed normal spinal fluid and 4 of these had previously had anti syphilitic treatment. Lumbar puncture was done on 10 cases of choked disc and five showed lues; in 3 other cases lumbar puncture was not done but Wassermann was positive. In regard to Argyll-Robertson pupils, the author emphasizes the importances of tests of the spinal fluid in determining the stage of the disease.

W. R. M.

THE RELATION OF LIGHT TO LIFE.—SCHANZ, E., Dresden (*Muench. Med. Woch.*, 1915, No. 39). In all animals, the entire covering tegument is sensitive to light impressions, while in the lower animals, it develops into a light perceiving apparatus, due to the provision of a photocatalysor. We believe that in the retina are visual substances, like the visual purple, that are decomposed by light. We know that there are pigments, whose growth is retarded by the influence of light. Further, it has been proven that albumens are photosensible. Therefore we must assume that the

albumins of the sensory epithelial cells undergo direct changes in the presence of light and that the visual purple and the retinal pigment epithelium functionate as positive and negative photocatalysors.

H. S. G.

MUSCLES

TORTICOLLIS RELIEVED BY TENOTOMY OF THE INFERIOR OBLIQUE.—DUANE, ALEXANDER. New York (*Arch. Ophth.*, January, 1916, XLV, 33), reports a case of torticollis relieved by a complete tenotomy of the inferior oblique muscle. Operation resulted in head nearly straight and only a few degrees of left hyperphoria remaining. The author states that the age at which operation should be done will depend upon the symptoms. If symptoms are marked, he operates early. The article is illustrated.

W. R. M.

NYSTAGMUS AND ALLIED CONDITIONS.—WILSON, JAMES ALEXANDER, Glasgow (*The Lancet*, October 23, 1915). This paper gives some details of 200 consecutive cases of nystagmus with some deductions therefrom. The ages of the patients indicate that this anomaly is more prevalent in youth and tends to disappear in adult life. Excluding young children, 88 per cent. had poor vision—6.15 or worse. Only 7 per cent. of the cases were emmetropic. Among the series were 24 miners and 8 albinos. The following conditions producing imperfect retinal images were present: Corneal opacities, 44; cataract, 16; optic nerve atrophy, 11; chorioiditis, 8; convergent squint, 34; divergent squint, 12; dislocated lenses, 2; and buphthalmos, 2. In one-half of the patients the onset was between 3 months and five years; in 19 per cent it was at birth or within three months; in 15 per cent. between 5 and 10 years. The nystagmus was lateral in 61 per cent., rotatory in 16 per cent., oblique or irregular in 13 per cent., vertical in 6 per cent., and lateral and rotatory in 4 per cent.

With the exception of three doubtful cases, the movements in all were concomitant—that is, both eyes rotating to the right together and to the left together; the investigation of this point was facilitated by the use of prisms with their edges together through which the eyes could be seen edge to edge or overlapped.

The writer next takes up the question of occupation: There were school children 68, housewives 31, general workers 38, clerks 3, miners 24, no occupation 8 and infants 28. He takes exception to the term "miners' nystagmus" and prefers the expression "nystagmus occurring in a miner," since the presence of ametropia and

other ocular defects establishes a liability to nystagmus apart from the nature of the person's occupation: the variation is only in the manner of obtaining imperfect retinal images: cases have been reported occurring in people who were employed in near work, such as type-setting, where there seemed to be a casual relationship between the industry and the disorder. Among the 200 cases there were 5 of the hereditary type.

He describes a number of abnormal cases presenting movement of the orbital muscles as allied to nystagmus, the first an example of "Jaw-winking," the second having the peculiarity of keeping one eye wide open while crying, and a third having slow rhythmic contractions of the right orbicularis palpebrarum occurring about once a minute. He also speaks of another group of cases, the so-called cyclic affections of the third nerve, in which although the nerve is paralyzed, rhythmic contractions occur in the muscles which it supplies producing some or all of the following: Elevation of the upper eyelid, contraction of the pupil and spasm of the ciliary muscle.

Regarding treatment he advises spectacles to correct errors of refraction; and operative measures that may improve vision should be adopted as soon as possible. He considers the following method of treatment worth a trial: Request the patient to look at one's finger held about 8 inches from the patient's eyes—a position involving a certain amount of convergence—then move the finger from side to side and get him to follow it with his eyes. After two minutes of this exercise close his eyes for a short time and then repeat, and so on. There is usually one position of the eyes in which there is little or no oscillation: perhaps the head is thrown back and to one side. From this position movements may be commenced. In this way we may be able to train the higher centers to obtain control over the lower. This method of treatment is not suitable for young children, cases of optic atrophy, or cases with very bad vision.

C. H. M.

A MUSCLE ADVANCEMENT (The Combined Use of the Advantageous Principles of Worth and Hulén).—HARDY, WM. F., St. Louis (*Amer. Jour. Ophth.*, December, 1915). In presenting a new muscle operation the author claims no invention or originality. The Hulén operation, while simple and easy to execute, possesses one inherent defect. The muscle stitch cuts out and allows the muscle to slip back, defeating to an extent the perfection of the cosmetic result, but the scleral stitch holds very firmly. On the other hand, the Worth operation provides a splendid muscle stitch,

but a weak scleral attachment. Consequently the author suggests a combination of the two operations, adopting the Worth muscle stitch and the Hulen scleral stitch. The article is accompanied by illustrations which show the size of bite with straight needle, half curved needle and full curved needle; also, an illustration to indicate the manner of introducing the sutures through muscle and sclera.

J. M. W.

MYOPIA

LATE RESULTS OF THE OPERATIVE TREATMENT OF HIGH MYOPIA.
—THOMPSON, A. HUGH, London, Eng. (Report of the November, 1915, meeting, *Ophth. Sect., Royal Soc. Med., Med. Press*, November 17, 1915). The author alluded to notes which he had published five years ago giving an experience with 20 myopic eyes which had been needled. The present paper relates his further experience of such of those cases as he had been able to keep in touch with. During the last five years, in common with many others, he had been chary about recommending this operation, though he still maintained that in carefully selected cases the treatment was a good one. As one could not be certain about the future of these eyes, the procedure should not be pressed upon any patient, for one could not promise cure, and the eye was left just as liable as ever to those destructive processes which attacked highly myopic eyes. The degree most suitable for operation was 16 to 22 diopeters. In young children, whose myopia was certainly progressive, a limit of 14 D. might well be assigned. With a myopia of more than 22 D. the chance of the eye remaining free from destructive processes was small. His method had been a free needling of the lens capsule, after which it was necessary to watch the patient carefully day by day, and in the event of a rise of tension let out the lens matter by means of a keratome incision through the cornea. Should a secondary membrane form some years after, this must be needled. He had been able to follow up 14 cases, during periods of five to fifteen years. Only one patient was operated upon in both eyes, and he did not think the advantage justified the double operation. In all the 15 eyes, the result of the operation was good, and the subsequent results he tabulated in detail. Two-thirds of the cases, after an average period of eight years, had materially better vision than before the operation. In not one of them had he to deal with a detachment of the retina as a sequela of the operation, though it was well known to occur occasionally. He did not think the operative treatment of high myopia tended to counteract

the increase in the long axis of the eyeball, though obviously the removal of the lens had the effect of diminishing the result of the lengthening of the axis of the eyeball on the refraction by about one-half.

C. H. M.

NERVOUS SYSTEM

BILATERAL PARALYSIS OF THE 6TH AND 7TH NERVES.—SNOWBALL, THOMAS, Burnley (*Arch. f. Ophth.*, 90, p. 155). The apparently congenital stationary affection occurred in an otherwise healthy girl, aged 11, without other anomalies, as found in the cases published. Wassermann's reaction was negative. Pirquet's tuberculin test uncertain. The examination revealed no etiological moment. S. considers it as a congenital nuclear ophthalmoplegia, as described by Uhthoff.

C. Z.

CONTRIBUTION TO THE KNOWLEDGE OF RELAPSING AND ALTERNATING OPHTHALMOPLÉGIA EXTERNA.—BIELSCHOWSKY, A., Marburg (*Arch. f. Ophth.*, 90, p. 433), observed for 5 years a student who at the age of 19 had for the first time diplopia, which disappeared after 6 days, so that he did not consult anybody until a year later, when diplopia with purely lateral distances recurred. During these next 5 years the following morbid stages changed at irregular intervals with repeated recurrences of some: I. a, paralysis, resp. pareses of several extrinsic muscles of both eyes supplied by different nerves, b, paresis of all extrinsic muscles of both eyes including the levators, c, perfect motility of both eyes in all directions with undisturbed binocular vision, but latent disorder of equilibrium (heterophoria) of concomitant (not parietic) type. II, complete intactness of the intrinsic ocular muscles. III, lacking of all sensory symptoms, the at first suspicious redness of the optic disc, as to a possible incipient optic neuritis, must be considered as a congenital anomaly, as it remained during the whole time of observation unchanged and did not give rise to disturbances of vision, visual field, or perception of colors. IV, the absence of all other subjective and objective symptoms aside of the ocular muscles.

The patient, who came from a neuropathic family, was otherwise healthy, and not syphilitic, as repeated negative Wassermann's reactions attested.

In the very instructive discussion of this case, B. shows that the affection must have been nuclear. It differed from relapsing periodic paralysis of the 3rd nerve, and tabes, multiple sclerosis, peripheral neuritis, myasthenia, could be excluded. The clinical

aspect was a pure form of the very rare relapsing and alternating ophthalmoplegia, possibly due to toxemia, from anomalies of metabolism, by means of vasomotor disturbances. These conditions may have been favored by an especial anatomical disposition of the vascular system. B. calling attention to the fact that the arteries supplying the nuclei of the ocular nerves are terminal arteries.

B. then reports 2 cases as instances of benign nuclear paralysis due to toxic influences transmitted by vasomotor disturbances, which may occur in otherwise perfectly healthy individuals and may partially or completely recover without subsequent complications. C. Z.

OPERATIONS

THE VALUE OF THE OCCLUSIVE BANDAGE IN CORNEAL AFFECTIONS.—RUMSEY, C. L., Baltimore (*Jour. Ophth., Otol. and Laryngol.*, November, 1915). The value of fluorescein as a diagnostic agent for corneal abrasions is emphasized. He believes that the occlusive bandage promotes more rapid healing of corneal wounds than where it is not used. He lays stress upon determining the presence of dacryocystitis as its oversight means disaster. M. B.

A SIMPLIFIED OPERATION FOR MAKING AN ARTIFICIAL PUPIL IN SECLUSIO PUPILLAE.—RICE, PHILIP, San Francisco (*Jour. Ophth., Otol. and Laryngol.*, November, 1915). A keratome opening is made into the anterior chamber through the scleral margin on the nasal side of the cornea. The incision is of the size that would be made for an iridectomy, and as it is completed the blade is withdrawn until the point has reached the iris attachment, when it is depressed and the point driven through the iris and a small opening made. At this point of the operation a pair of De Wecker scissors are introduced into the anterior chamber one blade of which is introduced through the iris opening and the iris severed near its attachment and the cut made upwards. This results in the severed portion of the iris falling down in a loose fold making a splendid pupil. There is but little reaction and the operation is not painful.

M. B.

OPTICS

TO THE QUESTION OF BIASTIGMATISM AND THE EMPLOYMENT OF BICYLINDERS.—ENGELBRECHT, K., Erfurt (*Arch. f. Ophth.*, 90, p. 160). As in every case any combination of bicylinders can be replaced by a single cylinder, E. sees no reason for reintroducing

bicylinders and for speaking of biastigmatism in the sense of Marquetz, if one does not wish to recognize a biastigmatism in every case in which the corneal astigmatism objectively measured with the ophthalmometer does not coincide with subjectively found astigmatism of the lens.

C. Z.

CONTRIBUTIONS TO THE VISUAL TEST ACCORDING TO SNELLEN.—WOLFFBERG, Breslau (*Arch. f. Ophth.*, 90, p. 249), discusses the following points: If the important characteristics for recognizing the letters are called indices, e. g. the gap C, without the perception of which C would be seen as O, all indices ought, according to Snellen's principle, appear under the same visual angle of 1'. Analyzing, however, the single letters, one finds aside of indices of 1' (as in C R S), others of 2, 3 and 5'. There are also letters (A V L T) which are recognized by their lines whose width corresponds to 5', whose length to 5'. The indices are never smaller than 1' and never larger than 5', no matter whether they represent lines or intervals. Those letters of the same optometric line are read easiest which are recognized by lines of 5' the hardest those in which the index is only 1'. W. unites these extreme indices of Snellen's optotypes, viz. a line of 5', interval and point of 1' on an octogonal card, on the back of which is only a line of 5'. The card can be held in all different directions, so that it can not be learned by heart. The person who recognizes the point at 6 m. must alread the more difficult letters of Snellen's row 6 6, and the person who recognizes only the line, not the point at 6 m., can read only the easier types of this row. W. therefore commences his tests with his card.

C. Z.

OPTIC NERVE

ON THE DEVELOPMENT OF THE MEDULLARY SHEATH IN THE OPTIC TRACT, CHIASM AND OPTIC NERVE.—SATTLER, C. H. (from the eye clinic of Prof. A. Birch-Hirschfeld in the University of Königsberg, *Arch. f. Ophth.*, 90, p. 271), reports with utilization of literature his investigations on twelve human foetuses, new born mice, guinea pigs and rabbits, with detailed description of his technic. With regard to localization, time and direction of the development of the medullary sheaths he found in foetuses of from 37 to 45 cm. length medullated nerve fibres in the optic tract abundant, in the intracranial portion of the optic nerve scanty, and in the intraorbital portion of the optic nerve none. At birth the medullated nerve-fibres in some cases have advanced near to the

lamina cribrosa. The degree of development of the medullary sheath fluctuates considerably. The recently questioned assertion of Bernheim is confirmed that from the part of the optic tract near the chiasm to the eyeball the medullary sheath develops in centrifugal direction. These fibres in the stage of medullary development are so numerous, that S. does not believe that they are other than the optic nerve fibres arising from the ganglion cells of the retina. In the mature stages examined by S. the individual optic fibres (centrifugal, pupillary fibres) cannot with perfect certainty be differentiated from the other nerve fibres by precocious maturity or other volumen. The medullary fibres in the eighth fetal month have an average thickness of less than 1 μ ; their magnitude increases with the age of the fetus. In the optic nerve of the newborn are thinner fibres than in the tract. At the time of the beginning development of the medullary sheath the glious tissue seems to abound in lecithin granules. The young medullary sheaths in their first appearance cannot be ascertained by the employed methods of fixation and staining in the shape of a closed tube, but in form of fine lecithin granules grouped around the axis cylinders.

C. Z.

A CASE OF HYPOPLASIA OF BOTH OPTIC NERVES.—SCHWARZ, OTTO. Leipzig (*Arch. f. Ophthalm.*, 90, p. 326). In a physically and mentally well developed girl, aged 18, there was only a trace of the optic disc in both eyes. In the left eye was a small round white spot, covered by a fine fibrillar glassy tissue, surrounded by the retinal vessels. Toward the temple and upwards a small yellowish red area bordered it similar to an attenuation of the chorioid, as often found near the disc. A retinal fovea could not be seen.

In the right eye was a nearly vertical oval yellowish reddish white place, $\frac{1}{2}$ disc diameter wide, $\frac{3}{4}$ disc diameter long, in front of which a glassy club-shaped cone projected from below inwards to above and in front, apparently a remnant of the hyaloid artery. Also here next to its temporal margin was a yellowish red thinned chorioidal area bordered by slight pigmentation. The retinal fovea appeared as a darker spot with slight annular reflex. Each eye was hypermetropic, V. with $+1.75 \frac{5}{10}$.

The nasal halves of the visual fields were almost completely lacking. The color sense showed no qualitative alteration.

The functional tests and the ophthalmoscopic picture indicated without doubt an incomplete development of both optic nerves, whose not crossed fibres were almost completely lacking, also the

crossed fibres being incompletely developed. S. assumed a not explicable defective development of the retinal embryonal layer, from which correspondingly less optic nerve fibres arose. C. Z.

PATHOLOGY

NEW FORMED BONE IN ATROPHIC EYES.—(*Doctorate Thesis*. Illustrated). COHEN, DAVID EZECHIEL, reports his findings in the examination of atrophic eyes with new bone formation. He first discusses the theories of atrophy and the connection between the atrophy and the new bone formation. He then describes the location of the bone in its relation to the structures of the eye and its result upon these structures, its presence in new formed connective tissue and the relation of the connective tissue as to location and effect. He cannot furnish any proof as to the exact reason for the bone development. He divides all atrophies into: anterior, including chiefly the structures involved in the region of the aqueous humour; posterior, including structures chiefly involved in the region of the vitreous humour; and those cases involving both anterior and posterior regions. He notes a true atrophy only in the lens, iris and retina. The distinction between the anterior and posterior atrophy suggests a like distinction between destruction of aqueous and vitreous fluids which does not seem to be the case in his findings. He includes in his causes of atrophy a decrease in the lymph fluids of the eye causing decreased tension; also the presence of a new formed connective tissue.

The location of bone he found to be in the chorioid (1) in the direct neighborhood of the warts (Drusen) and replacing the anterior layer of the membrane of Bruch; (2) in new formed connective tissue which lies upon the chorioid, (3) in new formed connective tissue within the chorioid. He concludes that the entire vascular chorioid, with its acme in the chorio-capillaris, has as its function in the normal eye the nourishment of the external layer of the retina; in the detached retina the vessels become sclerotic because they nourish less tissue and their lumen consequently diminishes; the chorio-capillaris does not follow this general rule and becomes thus abnormal, a vascular region without object for nourishment. The result is a thickening of the membrane of Bruch, a separation of the membrane into an anterior and posterior layer, the anterior subject to wart formation and later bone formation. He cannot account for the change from connective tissue into new formed bone.

E. E. B.

THE CURRENT OF THE OCULAR FLUID ALONG THE SUPRA-CHORIOIDEA.—GERBANDY, HISKIA RINTJE (*Doctorate Thesis*, illustrated), begins with the anatomy of the chorioid: its division into layers according to the caliber of the vessels, the chorio-capillaris, Sattlers membrane, the connection between the chorioid and sclera. Sattlers membrane is described minutely, showing the ramifications of all the fibres and describing the connection with the ciliary processes, the character of the fibres (collagenous or elastic) and the lamellar arrangement.

The supra-chorioid consists of a lamellar system covered with endothelium, of elastic fibres and pigment cells. These lamellae surround a system of spaces which in normal circumstances are equal, but can easily be enlarged to very large meshes in the anterior part, or narrower in the posterior part. These spaces communicate with the lymph system through the vena vorticosae. Again, the supra-chorioidea is a lymph channel for the ciliary body: the intra-muscular slits connect the supra-chorioidea with the spaces of Fontana, thus establishing the possibility of drainage of the aqueous into the vena vorticosae via a posterior current. Whether this actually occurs is considered by the author questionable. An abnormal fluid current from the aqueous might cause detachment of the chorioid but the clinical results of the operation devised to establish such a drainage (cyclo-dialysis) do not bear out the theory.

He concludes that a fluid current goes through the slits of the ciliary muscle, which has a forward direction to the spaces of Fontana anteriorily, and a posterior direction in the supra-chorioidea. A current in one direction through this channel does not exist.

E. E. B.

CHARACTER OF CELLS IN THE EXUDATES IN INFLAMED EYES.—TILMA, PIER JANS (*Doctorate Thesis*, illustrated), reports in detail the pathological changes in four eyes. Case 1. Sympathetic ophthalmia following perforating injury to cornea, sclera and lens. Removal of the injured eye did not prevent blindness in the other eye.

Case 2, an eye operated nine years before for myopia. Retinal detachment followed by severe pain resulted in its subsequent removal.

Case 3, perforating wound of the cornea with hemorrhage into the anterior chamber presented, after absorption of the blood, a rupture of the iris, irido-dialysis, and an exudate on the posterior

surface of the lens. The eye was enucleated on the seventeenth day on account of severe pain with decreasing tension.

Case 4, a blind eye was removed after being watched for ten years. The vision gradually decreased—due to opacity of lens. This was followed with deep chamber, shrinking of the lens, atrophy of the sphincter irides, dislocation of lens, opacity of cornea, loss of temporal vision, increasing pain causing removal.

In all the cases, all forms of exudate cells were present: polynuclear leucocytes, small mononuclear lymphocytes, large mostly mononuclear cells with faintly stained nucleus and with or without amoeboid extension, and plasma cells.

The writer discusses the genetic connection of these cells. He concludes that all exudate cells reach their place by their own locomotion and may be called wander cells, the plasma cells only could be questioned; that the poly-nuclear leucocytes predominate in acute and mononuclear cells in chronic processes; through chemotaxis the exudate cells are attracted to the place where they can be of most value; that the form of cells is largely determined by the tissue in which they are found.

As to the last, determination of the cell exudate by the tissue he noted: in all four eyes cellular exudate was found in the A. C.; polynuclears predominated in cases 2 and 4; in the iris in all but case 2 plasma cells were found, thickly scattered but never forming infiltrates as lymphocytes do and which latter were also found in the region of the sphincter, about the blood vessels, and in the posterior layers before the dilator pupillae. Large mononuclears were found in large numbers in case 2. In the ciliary body the exudate cells were found in the loose tissue between the muscle and elastic limiting membrane and were chiefly small lymphocytes. Plasma cells absent in the iris of case 2 were present in ciliary body in large quantity. The chorioid contained small lymphocytes, especially case 1. In the retina the lymphocytes appeared around the vessels, in the chronic cases especially. In the vitreous chamber large polynuclear leucocytes predominated. In the sub-retinal space in case 2 true giant cells were found.

E. E. B.

IRITIS AND OTHER OCULAR LESIONS ON INTRAVENOUS INJECTION OF STREPTOCOCCI.—ROSENOW, E. C., Chicago (*The Journal of Infectious Diseases*, Vol. 17, No. 2, Sept., 1915, p. 403), records further observations with illustrative experiments, the results of which indicate that iritis and certain other lesions of the eye, generally thought to be toxic, may be infectious in nature. In studying the eye lesions in 48 rabbits, intravenously injected with streptococci

from rheumatism, appendicitis, pyorrhea, tonsils, etc., he found iritis or iridocyclitis nine times (four times after injection of certain laboratory strains, three times with rheumatic strains, and twice following injection of streptococci from small pus pockets in tonsils of otherwise normal individuals). A pneumococcus strain, which had been isolated eleven years previously and which had long since lost its virulence, was passed through 18 animals without producing eye lesions. In the nineteenth passage it produced iritis in a rabbit, and in the twentieth passage suppurative conjunctivitis with iritis and marked hemorrhages and infiltration at the limbus in a dog.

Similar results have been obtained from injections of colon bacilli and streptococci. The lesions usually were acute and consisted of extravasation of red blood corpuscles and a variable infiltration of leucocytes. The organism injected was demonstrated in the lesions in large or small numbers by cultural methods, within the blood vessels adjoining the lesions.

The frequent occurrence of lesions about the ciliary body or the iris and the limbus might be thought to be due to the fact that here as in the structures about the joints and the more tendinous portion of muscles, there is a gradation of the supply of available oxygen, thus inviting localization and affording opportunity for the growth of bacteria, a circumstance which for the same reasons would make for lesions by circulating toxic substances, no matter from what source.

C. Z.

PHYSIOLOGY

THE BLIND SPOT.—GRADLE, HARRY S., Chicago (*Ann. Ophthalm.*, Oct., 1915). The author's summary of this very elaborate paper is as follows:

"1. A rough measurement of the blind spot can best be made by use of the Haitz binocular chart.

"2. If further investigation be desirable, a tangent screen offers the most accurate methods. In using this technic a double fixation should be provided for the patient's eye. The investigating disc is a blued steel ball, held to the surface of the screen by a magnet behind the screen. Thus there are no other moving objects to attract the patient's attention.

"3. The blind spot has been found to be of diagnostic and prognostic significance in toxic anisotropia, optic nerve involvement from accessory sinus disease, myopia, medullated nerve fibers, sympathetic ophthalmia and eclipse blinding, and consequently should be investigated in all of these conditions.

"4. If the investigations be conducted along these lines much valuable information, heretofore hidden from the average observer, will be revealed." M. B.

EXOPHTHALMOMETRIC MEASUREMENTS IN NORMAL INDIVIDUALS AND THEIR RELATIONS TO THE SIZE OF THE ORBITAL APERTURE.—BIENBAUM, H., Krakau (From the eye clinic of Prof. H. Sattler in the University of Leipzig, *Arch. f. Ophthalm.*, 90, p. 378). Two hundred and forty-one eyes of adult, not too old, men and 59 eyes of women, with a refraction from -1 to $+2$ were measured, i. e., the position of the eyeball was measured with the exophthalmometer of Hertel. Then the height and width of the orbital apertures were ascertained and from this the index calculated, viz., height of the orbital aperture multiplied by 100, divided by the width. The faults are given in tables. From these one sees that, even if also other elements partially play a part in the projection of the eyeball from the orbit, the size of the orbital aperture creates the rule that prominent eyeballs are combined with large and oval orbital apertures, deeply set eyeballs with smaller and round orbital apertures. C. Z.

CONSCIOUS VISION IN THE DEVELOPMENT OF THE AMBLYOPIC EYE.—LEWIS, F. PARK, Buffalo (*Ann. Ophthalm.*, Oct., 1915). He holds that binocular single vision is essential to the highest intellectual attainment. With the acquirement of binocular fusion by individuals who have not had it they freely admit a marked improvement in their ability to think clearly and to do better mental work.

There are two ways by which persons who have convergent concomitant squint with amblyopia in the nonfixing eye can acquire equal vision in the two eyes and perfect stereoscopic vision or fusion. Since these cases almost always have to wear glasses for the correction of hyperopic and astigmatic refraction errors, the first method is to so blur the vision of the better eye by the addition of several dioptries of plus spheres that the vision of this eye will be considerably below that of its fellow. The patient will naturally use the eye most that he sees the better with, and as he continues to exercise the visual function of this eye its vision will increase. At the same time the visual center for this eye will improve in power and finally when the other eye is relieved of its handicap they will both enter into the visual act on a par and stereoscopic fusion of the two images will be the result. The other method is more difficult and requires the persistent effort of an intelligent patient. It simply consists in the patient voluntarily compelling the amblyopic eye to take its

part in the visual act. The refraction of course is accurately corrected in each eye. The patient must maintain fixation with the eye which has been suppressing. As the trick is learned the eye will improve in vision and as it does there will finally come a time when the two eyes will attempt to act together. When this results there will be confusion and blurring. The combined vision will not equal that of either eye alone. The patient must persist, for the desired end is near and is shortly attained. Two cases are cited to illustrate each method.

M. B

THE DETERMINATION OF THE RELATIVE POSITION OF REST, BY PROLONGED OCCLUSION OF ONE EYE.—MARLOW, M. D., Syracuse, N. Y. (*N. Y. State Journal of Med.*, Nov., 1915). The writer points out that the determination of the relative position of rest is essential for thorough understanding of every case of asthenopia and that the tests elaborated for this purpose all depend upon the fundamental principle of annulling the binocular function in order to convert any latent deviating tendency into a manifest one; he divides the tests briefly into, 1, production of artificial diplopia by prisms; 2, the use of the Maddox rod to produce so great a dissimilarity in form of the two images that fusion is impossible; and, 3, the complete annulment of binocular vision by occlusion of one eye—the screen or cover test, which he considers the most reliable. The method to which the title of his paper refers is an extension in point of time of the last.

Prolonged occlusion is not a method for routine use; the average patient would not tolerate it; the loss of judgment of distance and the reduction in the field of vision and in illumination combine to make it quite other than a pleasant experience. But there are instances in which annoying symptoms persist in spite of the most painstaking correction of refraction and heterophoria, and in these patients are willing to submit to the inconvenience of the test. He has used the device for many years and was led to do so by the well known fact that when one eye is temporarily occluded a deviation not infrequently occurs.

The method adopted has consisted in replacing one of the patient's lenses with a ground glass, the more defective eye being the covered one, or in cases in which there was no difference, in deciding whether the patient was left eyed or right eyed by looking at a distant light with both eyes open through a ring held at arm's length and then occluding the eye not used for sighting. Only intelligent and serious patients could be used to whom the object and working of the test was explained so that they would avoid giving

the binocular function an opportunity to be active. The periods of occlusion generally varied from four to seven days. At the end of the period of occlusion lenses correcting the refraction and a Maddox rod are placed in a trial frame, the patient is directed to close his eyes, the occluding glasses are removed and the trial frame substituted for them. The patient then opens his eyes and the deviation is measured in the ordinary way. A tabulated list of the 90 cases in which this test was used is appended.

The percentages obtained under the conditions were as follows: Parallelism, 7% ; divergence without hyperphoria, 11% ; divergence with hyperphoria, 41% ; total, 58% . Convergence without hyperphoria, 4½% ; convergence with hyperphoria, 5½% ; total, 10% . Hyperphoria without lateral deviation, 24% . R. 9% . L. 15% ; hyperphoria with lateral deviation, 17% , or 71% of all cases.

More important than the relative frequency of the different positions of rest are the changes which actually resulted from occlusion. These were as follows: In 7 no change; in 5 a reduction in the amount of error; in 17 reversal of the form of heterophoria; in 6 esophoria changed to exophoria; in 1 exophoria changed to esophoria, and in 11 R. became L. hyperphoria or the reverse.

In 69 cases there was either an increase in the amount of error, or an error was found which was not demonstrable before occlusion. Subsequent measurements in some cases showed that the result of occlusion did not represent the total error, and this seems particularly true in those cases in which the period of occlusion was short; annulment of the binocular function for those short periods of time cannot be depended upon to do more than indicate the direction of the deviating tendency, and therefore the periods should be made as long as possible.

The writer concludes his article with the following conclusions: 1. That the ordinary methods, at any rate when used only for the short periods possible during a consultation, may fail to reveal the kind and particularly the amount of error present. 2. That while the method tends to show the true position of rest, the periods during which it is convenient to use it are insufficient to render the whole truth in the matter manifest. 3. That while the constant use of prisms tends to bring out the heterophoria, prolonged occlusion accomplishes this with much greater rapidity and is free from the objection raised against prisms. 4. That the total exophoria may greatly exceed the abduction as measured previous to occlusion, and the same may be true of other forms of heterophoria. C. H. M.

PHYSIOLOGICAL IRIDO-DONESIS.—BONNEFON, M., Paris (Abst. in *Muench. Med. Woch.*, from *Ac. Sc. de Paris*, 1915, No. 19). Irido donesis was formerly believed to be always of a pathological nature and due to rupture of the Zonule, luxation of the lens, aphakia, liquefaction of the vitreous, etc. By chance, B. examined a soldier with a slight injury to the pupillary area of the cornea and found a slight irido-donesis. Continued examination failed to reveal any cause for the condition, which was found to be present in the other eye. This led to the careful examination of a large series of normal individuals, where the condition was found to be present in about 5 per cent of the cases. The reason it was probably overlooked in the past is that the tremulousness becomes visible only upon minute excursions of the eyeball, but is wholly lost upon great voluntary movements. With lateral illumination the patient should be instructed to fix upon the finger held about 5 cm. in front of the eye and the observer uses a loupe of moderate power. Within a few seconds the eye tires and begins to make small oscillatory movements in order to maintain fixation. The irido donesis then becomes visible in the form of small waves or vibrations of the iris, near the pupillary edge, and running backwards. As soon as the eye comes to rest, these stop. This differs from the pathological irido-donesis in that the latter is found more toward the periphery of the iris and is usually coarser and more exaggerated, so that a loupe is not necessary.

B. gives the hypothetical explanations for the cause of this physiological irido-donesis: (1) Congenital slackness of the Zonule of Zinn; (2) slackness of the Zonule as the result of continued accommodation (accepting Helmholtz's theory of accommodation); and (3), the semifluid periphery of the lens is compressed by the act of accommodation, thus allowing a slight space for vibration of the pupillary edge of the iris (basing this upon the Tscherning theory of accommodation).
H. S. G.

PURKINJE'S PHENOMENON IN THE CENTRAL AREA OF THE VISUAL FIELD.—HERING, E., Leipzig (*Arch. f. Ophth.*, 90, p. 1), repudiates the assertion of some observers that Purkinje's phenomenon, viz., that many colored objects, especially red and blue ones, appear in the dusk in essentially different relations of lightness from those in bright day light, did not occur in the central area of the retina which is devoid of rods, even if the eye is dark adapted, because the cones were not capable of dark adaptation. He describes a very expedient method of eliciting Purkinje's phenom-

non very distinctly if the conditions are excluded, which must prevent its occurrence.

H. says that too low intensity of the blue light used in the experiments, undervaluation of the very intense absorption of the blue light by the pigment of the macula, insufficient consideration of the rapid local adaptation of the visual area corresponding to the retinal image of the colored field to a permanent illumination, finally a too great general dark adaptation of the eye, may have been the causes that a complete lacking of Purkinje's phenomenon in the foveal area has been asserted. Hence all far-reaching conclusions drawn from this supposed missing of the phenomenon fall to the ground.

C. Z.

CLINICAL INVESTIGATIONS ON THE DEPENDENCE OF INTRAOCULAR TENSION OF THE QUALITY OF THE BLOOD.—HERTEL, E., Strassburg (*Arch. f. Ophth.*, 90, p. 309), proved experimentally that in man, as in animals, the normal, but also the pathologically increased and decreased, intraocular pressure can be very much influenced by alteration of the quality of the blood. Hence it may be inferred that the constancy of intraocular tension requires constancy of composition of the blood and that perhaps certain deviations of ocular tension from the normal may be due to disturbances of blood mixture. This explains the hypotony, observed by Heine and Krause in diabetic coma, in which the increased concentration of the blood by sugar and acetone, oxybutyric acid, aceto-acetic acid, corresponds to the artificial augmented concentration by the introduction of sugar or salt in the experiments. 1

In studying the blood concentration in patients with glaucomatous rise of tension, H. selected more youthful individuals, under 42, for excluding disturbing complications often found in older glaucomatous patients, as diseases of the blood vessels, heart, kidneys, etc., which not rarely cause considerable alterations of the concentration of the blood, while the frequently increased arterial blood pressure in these affections has a decided influence on ocular tension. He found that the concentration of the blood in his glaucoma patients was essentially lower than in other patients who showed no increase of intraocular tension. From this H. concludes that the decreased concentration of the blood ascertained in glaucoma, if confirmed by further investigations, may be a predisposing element to hypertony of the eye. A case is reported of a decidedly higher concentration of the blood of a man, aged 38, during an attack of glaucoma than before, by alteration of the molecular and albuminous concentration. This concentration may have been due

to vasomotor changes from psychical influences as observed by Grawitz. H. says that if we consider that glaucomatous attacks not rarely are elicited, like in his case, by psychical causes or by sudden cooling, the thickening of the blood during a glaucomatous attack, as in his patient, does not seem inconceivable. In support of this view he mentions the favorable effect of warm baths and venesection in glaucoma by thinning the blood. H. used the injections of concentrated salt solutions with great advantage for rapidly decreasing the intraocular tension in glaucoma and thus created better conditions for operation.

C. Z.

ABOUT DE- AND REGENERATION OF THE MOTORIC ENDPLATES AND THE DOUBLE INNERVATION OF THE STRIATED MUSCLE-FIBRES OF THE MAMMALIA.—(Illustrated.) BOKE, PROF. J., in a paper before the Anatomische Gesellschaft in München, in 1912, corroborated the findings of Sherrington that the ocular nerves, 3, 4 and 6, are not true motor nerves which receive their sensory fibres from the Trigemini and sympathetic fibres from the Carotid plexus, but that they are of a mixed nature from the beginning. By experiments on the cat he demonstrated in nerve Trochl. a set of medullated nerve fibres and a set of non-medullated fibres. The non-medullated fibres penetrate the muscle from the nerve Trochl. and form a plexus of non-medullated fibres evidently a sympathetic nerve plexus. These fibres form extraordinarily small, delicate endplates at the surface of the muscle fibres in such a way that apparently every muscle fibre receives an endplate. The endplates are extremely complex and form the delicate network. They lie in the granular sarcoplasm and are distinct from the sensory endings lately described by Dogiel. The striated muscle fibre is innervated in a double sense by nerve-endings with hypolemmal situation and therefore probably the centrifugal excitation. The striated muscles are intimately connected with the autonomous muscle system.

E. E. B.

OPTICAL ILLUSIONS.—WASSENAAR, TH. (*Folio Neuro-Biologica*, Bd. VIII, Nr. 3, 1914) attributes the cause of nearly all the optical illusions to irradiation of impulses in the retina.

Experimentation has shown that the intermediate points as well as the points of the retina upon which the image falls, are stimulated. This can only be explained by accepting that there exists an irradiation of the impulses of the retina. The ideal observation is one free from illusion, but does not exist under usual circumstances, the cause of the illusion being inseparable from the figure. We

may, however, in abstracto, suppose that such an observation exists in order to understand clearly the question: what are the reasons for the alteration in the ideal observation? In the greater part of pseudoptics irradiation of impulses is the cause of the illusion. It is better to leave the question as to the existence of irradiation in the brain, undecided, and to suppose that the irradiation in the retina leads to alterations in the observations.

W. applies his theory to the optical illusions of Zollner, of Pogendorff, of Delboeuf, of Miller-Lyer, of Baldwin, of Hering, of Loeb, of Kriesow and Botti; and adds three illusions which he believes have not been described: (1) dealing with concentric circles; (2) dealing with semi-circles drawn obliquely one above another; (3) dealing with angles with their apices in one straight line, opening in opposite directions alternately. Other theories are reviewed.

E. E. B.

MEDICAL SOCIOLOGY

OCCUPATIONAL DISEASES OF THE EYE.—HILLEGAS, WM. M. Philadelphia (*Jour. Opth., Otol. and Laryngol.*, Nov. 1915). This is a very long paper dealing with (1) diseases due to eye-strain; (2) diseases due to the entrance of poisons in the body, or into the eyes; (3) diseases due to excessive heat and light; (4) diseases due to injuries. The article does not lend itself well for review and to be appreciated will have to be read in the original. M. B.

SOME OBSERVATIONS ON OPHTHALMIC TEACHING.—METZGER, J. D., Pittsburgh (*Jour. Opth., Otol. and Laryngol.*, Nov., 1915). The allotment in time required of the present medical student is sufficient to secure for him a thorough groundwork in these specialties which formerly were given but passing notice. In industries, the apprentice must become so expert in every department as to be able to assume charge of any part upon his completion of the whole. Why not so in medical training? The times are increasingly demanding expert special advice from the general physician and the college must not fail him in his equipment. The frankness with which the average physician acknowledges his ignorance of eye maladies is as salubrious as it is pathetic. He has not applied his theoretical knowledge, and therefore soon forgets it. This is not true of surgical technique, even though he does not apply it. Why this variance? It is because surgery has been drilled into his mind and the specialties have not. In order to get teachers who will do this they must be all time men with sufficient compensation to get

good men. No other science is taught in the manner that obtains in most of our medical schools. As long as the problems of making a living engross and hamper the mind, there can be little effective energy spent upon problems of life. M. B.

VALUE OF PROPER CARE OF EYES DURING CHILDHOOD AND ADOLESCENCE.—REED, R. G., Cincinnati (*Jour. Ophth., Otol. and Laryngol.*, Nov., 1915). A protest is made against the present system of education insofar as the unnatural environment tends to overtax the eyes of the developing child. He reports the case of his son who developed at an early age a tendency to squint. He was found to have myopic astigmatism with poor vision. Glasses were prescribed and changed from time to time. Protests were made to the school authorities against the child being compelled to study at night, but without avail. By taking the child out of school and placing him on a farm and all near use of eyes stopped an improvement in vision was noted. He was then again sent to school and placed on the farm during vacations. In this way he made progress and graduated from the university engineering department at the age of 23 with vision of xx/20 with —1.00 cyl. ax 180 over each eye. M. B.

CONTRIBUTIONS TO THE SCHOOL HYGIENIC IMPORTANCE OF THE EARLY DIAGNOSIS OF ERRORS OF REFRACTION WITH DESCRIPTION OF A COMPLEMENTARY OPTOMETER FOR THAT PURPOSE.—KRUSIUS, M., Berlin (*Arch. f. Ophth.*, 90, p. 239), examined 3710 pupils of Prussian schools, giving the results in tables. The most important points were the percentage of the degrees of the different ametropias in the individual schools, and of the spherical-ametropic complications, of astigmatism and its dioptric degree in these schools; heredity; numbers of the considerable increase of myopia and those in need of corrections before and after puberty, the proof that not even half of the ametropes in need of spectacles in the Prussian high schools has been recognized and corrected; the emphasis of the absolute hygienic necessity of detecting, at the beginning of the school and in annual controlling tests, the ametropes that require glasses and those with insufficient correction and of placing them under specialistic care. A complementary ophthalmometer for ascertaining the refraction is described in detail, which enables the school physician for an orientating eye examination and corresponding specialistic reference. C. Z.

RETINA

ANATOMICAL EXAMINATION OF A CASE OF ANGIOMATOSIS OF THE RETINA (VON HIPPEL'S DISEASE).—EMANUEL, C., Frankfurt a. M. (*Arch. f. Ophth.*, 90, p. 344). The left eye of a boy, aged 2, showed moderate divergence for about 8 weeks and slight ciliary injection. The cornea was diffusely dotted, iris atrophic. As there was a yellowish grey reflex from the interior and increased tension, the diagnosis of glioma of the retina was made and the eye enucleated. Most conspicuous were the changes of the detached retina: hemorrhages and exudations, partly with formation of cysts, extensive colloid and hyalin degenerations of the retinal tissue and homogeneous formations in the sub-retinal space. These degenerations were localized in the external layers of the peripheral portion of the retina where the inner layers presented a colossal accumulation of large vessels. There was also a circular proliferation of capillaries with interspersed epithelial cells on the pigment epithelium in connection with the vessels of the ciliary body. These degenerations and proliferations in the subretinal space, extensive hemorrhages and exudations, suggested the diagnosis of exudative retinitis (Coats).

The undoubtedly angiomatous new formation at the ciliary body, however, and the tumor like longitudinal growth of the arteries and veins in the peripheral, otherwise very little vascular, parts of the retina determined E. to assume an angiomatosis as the primary process. Then all other processes, presenting the anatomopathological picture of exudative retinitis, could easily be explained as secondary. Most probably the affection was congenital. In future cases suspicious of tumor of the retina one must also think of angiomatous proliferations, without always being able to avoid a wrong diagnosis, as in this case. C. Z.

RETINITIS EXTERNA EXUDATIVE WITH BONE FORMATION IN A SEEING EYE.—AXENFELD, TH., Freiburg i. Br. (*Arch. f. Ophth.*, 90, p. 452), gives the clinical history and histological examination of one eye of a man, aged 63, affected successively on both eyes with exudative external retinitis, who came to A. in 1913. In 1909 the patient noticed a dark shadow at the fixation point, V 4 25. The ophthalmoscopic pictures showed interesting peculiarities. At first it was normal. After 10 days beginning with paramacular punctiform hemorrhages a greyish red patch developed partly surrounded by small hemorrhages. Its form resembled a preretinal hemorrhage, but was not as deeply red. During the whole course no

sudden acute phenomena developed, as larger hemorrhages. Gradually the focus grew larger on all sides, with marginal small hemorrhages, but none in the center. Then the hemorrhagic character subsided and a tumor-like picture arose in the right eye which was enucleated by the attending well experienced surgeon, while in the left eye a flat cicatrization took place.

A. infers that the hemorrhages originated exclusively in the exterior retinal layers, from their localization at the margin of the focus, which developed in the same stratum with the pseudotumor, i. e. immediately in front of the chorioid. The irregular destructions in the external retinal layers extending beyond the area of the pseudotumor possibly may have been due to former hemorrhages. The color and shape of the hemorrhages showed that they could not have originated in the chorioid, and also the later marginal hemorrhages probably came from the deep capillaries of the surrounding retina, not from new formed vessels of the pseudotumor. A.'s observation corroborates the assumption of Leber, that the hemorrhages are only temporary and partial phenomena of the whole process, and the primary affection is a degeneration of tissue in the exterior layers of the retina, followed by an inflammatory infiltration, with or without hemorrhages, and a proliferation of tissue with formation of peculiar membranes.

The extensive bone formation in the, aside of the central scotoma, seeing eye was unique. Generally the intraocular metaplastic ossification in phthisical and otherwise degenerated eyes is ascribed to the chorioid. A. emphasizes that this is not correct as the bone more frequently develops in front of the chorioid in the exudations. Thus the external exudative retinitis has by the formation of pre-chorioid exudations and proliferations an especial propensity to ossification which in this case occurred unusually early.

According to A. the question, how far the products of external exudative retinitis are of retinal or chorioid origin or are derived from the pigment epithelium and which part the hemorrhages play, is still open for discussion. His observation showed that clinically and microscopically the retinal changes predominate.

With regard to the differential diagnosis from a malignant tumor A. thinks that if the whole process has been observed from the beginning, as in his case, external retinitis can always be diagnosed as such. For no intraocular tumor develops in the described fashion. In real tumors hemorrhages have occasionally been observed, but not in this peculiarly fluctuating, marginal form, accompanying the spreading of the disease. Such red foci are never encountered in the course of a tumor, not even in vascular sarcomas. An angioma

in otherwise intact eyes is such an extreme rarity that it can be excluded, and, as long as sight is preserved, it would not urgently require enucleation. C. Z.

HEMERALOPIA IN THE ACTIVE SERVICE.—PAUL, Halle (*Muench. Med. Woch.*, November 9, 1915). Observation on 16 cases that developed during active field service in the present war. The author comes to the following conclusions:

(1) The war form of hemeralopia is not an eye disease, but is due to a cerebral disturbance.

(2) It usually results from nervous relaxation and psychic depression.

(3) The prognosis is still uncertain and depends to a great extent upon the complete absence of nervous and psychic traumata.

H. S. G.

AVIATOR'S DAZZLING (BLENDUNG).—ZADE, M., Heidelberg (*Muench. Med. Woch.*, November 2, 1915). In an extremely instructive article, written principally for the army surgeon, Z. speaks of the causes of retinal dazzling and its occurrence during the usual course of life. He divides it into central and peripheral. Among 150 cases from the various branches of the service, examined for the after effects of dazzling, there was not a single scotoma. But among 162 cases in the air-craft service, 31 showed the scotomata following retinal dazzling. This occurred principally among the crews of the anti-air-craft guns, who constantly search the sky for the enemy. The scotoma was always peripheral and usually in the lower portion of the visual field. It most frequently was in the neighborhood of the 10 or 50 degree meridian. Z. claims that this condition can be averted by the use of Euphos or Hallauer or similar glass.

H. S. G.

SCLERA

MASSIVE GRANULOMA OF THE SCLERA (BRAWNY SCLERITIS), WITH THE REPORT OF AN UNUSUAL CASE.—DERBY, GEO. S., Boston, Mass. (*Arch. Ophth.*, January, 1916, XLV, 20), refers to the reported cases of Brawny Scleritis, discusses the symptoms, prognosis and etiology, and reports a case occurring in his own practice. Pathologic examination of the specimen showed a slow invasion of the sclera by granulation tissue extremely rich in plasma cells, associated with an abundant new formation of dense fibrous tissue. Within the new tissue, were small areas of purulent infiltration and

caseation. Obliterative endarteritis was present. Involvement of the intraocular structures was relatively slight compared to the scleral process. There was partial separation of the retina, due, probably, to transudation of serum from the oedematous and infiltrated choroid. The author believes that the inflammatory process in his case is identical with that described as endothelioma of the optic nerve by Parsons. Pathological examination did not reveal the etiology, but apparently excluded tuberculosis and all known infections except syphilis. The changes were most marked in the posterior half of the eyeball. The article is illustrated.

W. R. M.

TOXICOLOGY

ETHER AS AN ANTIDOTE FOR COCAIN AND NOVOCAIN POISONING. —ENGSTADT, G. E., Minneapolis, Minn. (*Amer. Jour. Surg.*, January, 1916). The writer refers to a paper on this subject which he published in the *Jour. A. M. A.* in 1910; since then he has had the opportunity to test the action of ether in a large number of cases of poisoning; in addition, reports have tended to confirm his earlier claims for ether as a safe and generally certain antidote for cocain and its synthetical preparation substitutes. Cocain lowers the blood pressure with a tendency to inhibit the complete systolic action of the heart, especially the right side; it also inhibits the respiratory action due to poisoning of the respiratory centers of the brain; the heart becomes flabby and there may be overstimulation of the accelerator nerves. When the right side of the heart does not synchronize either in systole or diastole, this form of heart block, in cases of cocain poisoning, may be due to anesthetizing of the bundle of His, by the direct action of the drug circulating in the blood. Ether, on the other hand, is a rapidly acting diffusible cardiac stimulant to vasomotor as well as respiratory centers, increasing the blood pressure, and having apparently a special affinity for the toxic elements of diffusible alkaloids. Corbit, of the Univ. Minn., has confirmed experimentally on animals, the clinically-known fact that ether is a safe and efficient antidote for cocain and synthetically prepared substitutes.

The ether is administered as ordinarily given to produce surgical narcosis. To get the best results, it should be given only to the degree of mild surgical analgesia, or at times even less than this. A mask should be employed and the ether be given by the drop method; this is important; given by the old method, the ether would only add to the danger of asphyxia by excluding air from the lungs engorged with venous blood.

The writer concludes his paper with a short account of a patient, a girl of 12, who exhibited marked signs of cocain poisoning as a result of a few drops of a 2 per cent. solution which had flowed into the nose through a pervious nasal duct; there was dyspnoea, respirations about 40, generally intercostal with an occasional diaphragmatic sighing inspiration, peculiar pallor of the face, eyes large and pupils dilated, persistent restlessness and extreme and characteristic anxiety; the pulse was barely perceptible. After the first few whiffs of ether, the respiratory movements became normal, the pulse regained its tension, the mind became clear and calm, and the anxious expression disappeared.

C. H. M.

WOOD ALCOHOL AMBLYOPIA—A CASE.—CAMPBELL, J. A., St. Louis (*Jour. Ophth., Otol. and Laryngol.*, September, 1915). The patient, a woman of sixty, gave a history of poor vision in left eye which became much worse about two years previous to examination following a splash of wood alcohol in left eye while bathing a lady's chest with this fluid. The alcohol rubs were continued for about two weeks. It was from this time that her eyes began to fail. When seen by the author the vision of left was nil and the right reduced to xv/20 with slight contraction of field. The ophthalmoscope showed a gray atrophy apparently equal in each disc. In the absence of any other physical cause the author assumes that the alcohol was responsible.

M. B.

TRACHOMA

ON THE TREATMENT OF TRACHOMA.—KIRIBUCHI, K., Tokio (*Arch. f. Ophth.*, 90, p. 413), describes the treatment of trachoma practiced at his clinic. After instillation of a 4% cocain solution the upper fornix is held everted and with a double edged instrument innumerable scarifications are made into the granula, infiltrations, and the upper portion of the tarsus deep into its tissue. The granula and infiltrations are expressed between finger and a piece of cotton saturated with sublimate solution 1:5000. After irrigation airol powder on a piece of cotton is rubbed on the wound. The same is done on the lower lid. After 3 days the applications of sublimate solution and airol powder are repeated daily. From his experience on over 6,000 eyes K. found that this method shortens the healing process very materially, prevents relapses and has a most favorable effect on secondary affections of the cornea.

C. Z.

SUCCESSFUL TREATMENT OF TRACHOMA AND FOLLICULAR CONJUNCTIVITIS BY INTENSE BICHLORIDE RUB.—BEALS, M. D., New

York (*N. Y. Med. Jour.*, November 1, 1915). The usual routine treatment of trachoma and follicular conjunctivitis by blue stone, tannic glyceride, argyrol, etc., has shown but poor results when applied in the thousands of cases of school children on the records of the health department of New York. In the few cases where it has been possible to induce the patient to submit to the roller operation, many have shown that it has been impossible to make a clean sweep of the entire affected region, and also that a large amount of scar tissue almost invariably follows the operation, as is also the case with blue stone treatment continued for a prolonged period.

The writer advocates a form of treatment which he calls "intense bichloride rub" in both trachoma and follicular conjunctivitis, quicker results being observed, naturally, in the latter affection. After cocainization with 10 per cent. solution, a cotton pledget firmly twisted on the end of a heavy steel applicator, so as to be as large in diameter as a lead pencil, is used to rub in a 1:1000 solution of bichloride of mercury. The lashes of the upper lid are grasped with the fingers of the left hand and the lid raised from the eye; the cotton pledget is passed up as far under the lid as possible and rolled slowly but firmly from side to side, while at the same time the lid is lifted and put upon the stretch; as the probe passes from side to side, it is rotated in the opposite direction from which it is moving, especially at the inner and outer angles. Directing the patient to turn his eyes upward, the same procedure is pursued with the lower lid.

After the first few treatments there is usually a slight staining of blood on the cotton. Cold compresses are applied for a few hours if the reaction is severe and 1:5000 bichloride is instilled 3 times a day, between treatments. Treatments are repeated once in five to seven days; after some clearing up, the affected conjunctiva only is rubbed; subsequent to the second treatment all discomfort will subside in 15 to 30 minutes.

The writer has used this method of treatment in several hundred examples and speaks highly of the results. In one series of 125 he claims 50 cures in 3 months, and improvement in the rest. He lays stress upon the necessity of correcting errors of refraction in these diseases. He says that there results practically no scar tissue.

C. H. M.

TUMORS

GLIOMA OF THE RETINA WITH REPORTS OF A CASE.—STERNBERG, Jos. E., Boston (*Jour. Ophth., Otol. and Laryngol.*, November, 1915). The symptoms of this affection are described. The case of a child of two and a half years is reported. Parents noticed a glairy appearance of the pupil when she was a year old which was noticeable only at night but six months later they noticed it both day and night. When seen by the author oblique illumination showed a golden reflex. Ophthalmoscopic examination—refractive media clear; on the retina a yellowish raised shiny mass, elevation +4, the mass seeming to start in the vicinity of the papilla. The possible malignant nature of the tumor was explained to the parents and enucleation advised but was refused. The child was seen from time to time and it was six months later before fever, vomiting, oedema of eyelids, and enlargement of eyeball, which was stony hard, were noticed. Enucleation was now consented to. About a month later there was a recurrence of the growth in the orbit which rapidly advanced. A month later exenteration of orbit was performed. Seventeen days later death occurred from brain involvement. Diagnosis by pathologist of intraocular growth-glioma.

M. B.

CARCINOMA, APPARENTLY PRIMARY, ARISING FROM THE CILIARY PROCESSES.—NEEPER, E. R., Colorado Springs (*Ann. Ophth.*, October, 1915). The insidious onset of such growths is pointed out. Symptoms may not be pronounced until the tumor presents itself through an irido-dialysis. It may not do this but gain considerable size and encroach upon a good deal of the vitreous chamber if it arises in the posterior ciliary fibers or is an extension from the adjacent chorioid. Recurrent hemorrhage into the anterior chamber is a frequent occurrence and masks the diagnosis. The opinion seems to prevail that primary carcinoma of the ciliary body is of very rare occurrence. A considerable portion of the article is taken up with quotations on this point.

The author's case occurred in a man aged 52 who was first seen in August, 1914, and at that time described a dark object before the right eye. No other subjective symptoms except that vision was lowered to 20/60. The only objective signs were an intraocular projection toward the center of the vitreous and this mass did not transilluminate. In six weeks the lens became opaque, the iris was distended forward with pearl-like clusters at the periphery. The eye became painful, red and tender. The eye was enucleated

in October. There were no signs of any malignancy elsewhere in the body at this time and none appeared until the March following. An olive-shaped tumor was then discovered beneath the abdominal skin and following it others appeared elsewhere on the trunk.

The eye was examined and reported upon by Dr. Geo. S. Dixon of New York, his diagnosis being "Carcinoma arising from the ciliary processes."
M. B.

A FALLACY IN THE DIAGNOSIS OF GLIOMA RETINAE.—STEPHENSON, SIDNEY, London, England (Report of November, 1915, meeting, *Oph. Sect., Royal Soc. Med., Med. Press*, November 17, 1915). The author gave the clinical and pathological details of two cases, both in young children, whose blind eye was excised under the impression that it contained glioma. It was found, however, that it was affected with the rare disease retinitis exudativa (retinitis haemorrhagica externa). He laid stress on this possible source of confusion.
C. H. M.

A PRIMARY TUMOR OF THE OPTIC NERVE SUCCESSFULLY REMOVED WITH PRESERVATION OF THE EYEBALL, BY THE KROENLEIN METHOD.—KNAPP, ARNOLD, New York (*Arch. Ophth.*, November, 1915, XLIV, 660), reports a case of tumor of the optic nerve which was removed by a Kroenlein osteoplastic resection of the outer bony wall of the orbit. Following operation there was perfect motility of the eyeball and the retinal circulation apparently was unaffected. The tumor was not limited to the apex of the orbit but extended into the cranial portion of the optic nerve. Incomplete removal was not followed by recurrence. Clinical history of the case is given and results of microscopic examination. The article is illustrated.
W. R. M.

ON PAPILOMA OF THE CONJUNCTIVA.—FREYTAG, G. (From the eye clinic of Prof. H. Sattler of the University of Leipzig, *Arch. f. Ophth.*, 90, p. 367), reports the clinical history and histological examination of a case of benign multiple papillomas of the upper and lower lids of the left eye of a child, aged 4, without known etiology, which relapsed several times after excision. A review of the literature showed that papilloma was observed on the ocular conjunctiva in 6 cases, limbus 11, semilunar fold and caruncle 10, conjunctiva of the upper lid 3, lacrimal sac 1. Although papilloma generally is a benign tumor, occasionally a transition into carcinoma occurs, as shown in 4 cases. The treatment consists in

excision in the healthy tissue. Papilloma has a great tendency to relapses, which was observed in 12 out of 34 cases. C. Z.

TO THE KNOWLEDGE OF GLIOMA OF THE RETINA AND ITS SPONTANEOUS INVOLUTION.—PURTSCHER, O., Klagenfurt (*Cent. f. Prakt. Aug.*, 39, November-December, 1915, p. 193), reports the clinical history of a glioma family of 11 children, 6 boys and 5 girls, of parents with healthy eyes. The two youngest boys died of bilateral glioma. The two oldest sisters presented an unusually striking ophthalmoscopic aspect of the left eye, which P. shows must be regarded as the product of regression of the glioma. Out of 3 children, 2 boys and a girl almost 3 years old, of the second youngest sister the younger boy had advanced glioma of the left eye, from which he died without operation. The older boy showed, like his aunt, a most peculiar ophthalmoscopic condition, which also had to be considered as a glioma in a state of involution. Both cases of the latter type speak for the possibility of a spontaneous healing of glioma. P. hails the systematic radiotherapy with Roentgen rays, devised by Axenfeld, with far reaching hopes. C. Z.

A REMARKABLE CASE OF CARCINOMA OF THE ORBIT.—BIRCH-HIRSCHFELD, A., Koenigsberg (*Arch. f. Ophth.*, 90, p. 299), observed a carcinoma of the orbit in a woman, aged 35, which, as the autopsy revealed, originated from the hypophysis, occupied the right temporal lobe, infiltrated the Gasserian ganglion and broke through the temporal bone into the temporal and masseter muscles. Without cerebral symptoms it had spread into the orbit through the orbital veins and was combined with inflammatory symptoms, which characterized the clinical aspect until exenteration. The violent pain, from which the patient was suffering was due to compression of the Gasserian ganglion by the tumor. The intermittent increase of exophthalmus was caused by disturbances of circulation from the propagation of the tumor cells in the orbital veins.

At the nasal side of the chorioid several small nodules of tumor were found in the interior of a larger vessel, while the corresponding interstitial tissue showed considerable infiltration. The central retinal vein was very much engorged, apparently from a nodule of the tumor on the central vein at its exit from the optic nerve or in a vein in the direct surroundings. The absence of lymph stasis in the optic nerve, of a distension of the vaginal space and of a compression of the optic nerve in its entire orbital course as well as the presence of this tumor thrombus in a vein, which was in direct relation to the central vein, suggested that the choked disc

was a direct consequence of a primary compression of a vein outside of the optic nerve. B. could not find a similar case in literature. His case showed that in cases in which all symptoms indicate an inflammatory disease of the orbit, the simultaneous existence of a malignant orbital tumor cannot be excluded with certainty. C. Z.

TO THE KNOWLEDGE OF MIXED TUMORS OF THE LACRIMAL GLAND.—BIRCH-HIRSCHFELD, A., Koenigsberg (*Arch. f. Ophth.*, 90, p. 110), reports a typical case of mixed tumor of the left lacrimal gland of a man, aged 51, displacing the eyeball 11 mm. downwards with exophthalmus of 11.5 mm. It produced hypermetropic astigmatism, reducing V to 6/100, after correction 1/3. The optic disc was slightly hyperemic, but not prominent. After temporary resection of the temporal wall of the orbit according to Kroenlein, a round tumor of the size of the egg of a hen in a capsule of connective tissue was removed with perfect recovery and normal vision. There was no relapse or metastasis within the 6 years elapsed after the operation.

The histological examination is described in detail. From this and 75 cases from literature B. gives the following résumé: A larger number of tumors of the lacrimal gland and its immediate neighborhood, which have been described under very different names, may be classed under the uniform term of mixed tumors. These tumors are anatomically characterized by a very complicated structure. They contain epithelioid cells, arranged in glandular formations, reticular cell strands or solid cones. Morphologically they are partly identical with regular epithelium, show a basal membrane, typical intercellular bridges and occasionally signs of cornification. The different relation of these parenchyma cells to the surrounding stroma, which is partly myxomatous, partly hyaline, partly contains islets of cartilage, presents at some places the aspect of endothelioma, at others of typical cylindroma, at still others of adenomyzoma or chondromyzoma. B. considers the epithelial nature of these parenchyma cells as more probable than their endothelial origin, from his studies of the mixed tumors of the salivary glands, with which those of the lacrimal gland show a far reaching identity. Clinically the mixed tumors of the lacrimal gland at first are of slow growth, which suddenly may be accelerated, the tumors becoming malignant, leading to local relapses and metastases. Therefore the early and complete, if possible blunt, removal of the tumor is indicated. Very probably the mixed tumors of the lacrimal gland are due to scattering of embryonic germs by dis-

turbances of development, perhaps in the third embryonic month when the proton of the lacrimal gland comes in relation to the primordial cartilage of the frontal bone. C. Z.

ON CHANGES OF THE EYEBALL BY PRESSURE OF AN ORBITAL TUMOR.—BIRCH-HIRSCHFELD, A., AND SIEGFRIED, C., Koenigsberg (*Arch. f. Ophth.*, 90, p. 404). A man, aged 43, stated in 1907, that his right eye had been bulging for about 2 years. There was exophthalmus of 3 mm., V. and fundus normal and no pain. A retrobulbar angioma was diagnosed. After 6 years the exophthalmus had increased to 10 mm., the eyeball was displaced upwards and scarcely movable, the lower portion chemotic, cornea diffusely opaque, tension diminished, fundus normal, V. 6/15. A soft tumor could be felt through the lower lid. After introducing magnesium sticks into the tumor according to Payr, the protrusion increased to 15 mm. and the eye became painful. As the attempt of enucleating the tumor with preservation of the eyeball proved to be impossible and a profuse hemorrhage occurred, the exenteration of the orbit was performed.

The anatomical examination revealed a fibrosarcoma, which was situated on the lower surface of the intensely deformed eyeball. The cornea was opaque and indented and the intraocular space diminished leading to folding of the chorioid and retina with detachment. Further consequences of the pressure by the tumor were the intense venous congestion of the optic nerve, retina and chorioid, and hypotony due to resorption of vitreous fluid like after pressure bandage. C. Z.

UVEAL TRACT.

MALIGNANT UVEITIS TREATED WITH THYROID EXTRACT.—BORDLEY, JAMES, Baltimore (*Arch. Ophth.*, November, 1915, XLIV, 638), refers to eight cases of uveitis treated with thyroid extract. Marked success was attained in four, two were doubtful, and two were failures. Clinical histories are given in five of the cases. W. R. M.

VISION AND COLOR VISION

CONSCIOUS VISION IN DEVELOPMENT OF AMBLYOPIC EYE.—LEWIS, F. PARK, Buffalo (*Annals of Ophth.*, October, 1915). The purpose of this paper is to emphasize (1) that the coordination of the eyes in producing binocular sight is intimately associated with the activating of the brain, and that, as its corollary, the dissocia-

tion of this function interferes with the power of rapid and accurate thinking; (2) that amblyopia in heterophoria and in heterotropia is the result of a purposeful and conscious suppression of the visual images in the sight center on one side of the brain, and that restoration of the lost function can be accomplished only by an even more definitely conscious direction of the nerve energy from the neurons and through the channels whose functions had previously been inhibited; and (3) the suggestion of practical measures by which the lost function can be restored.

The writer explains the well-known theory of the production of amblyopia from disuse, and the occurrence of convergence associated with diplopia when the eyes are unable to function together and the subsequent suppression of the disturbing image. He claims that it is not only possible to restore sight where it has become dulled from non-use in those who are no longer children, but its restoration will be associated with all the betterment that comes from the establishment of normal binocular sight. This refunctionating can be done only by a conscious effort to use the defective visual tract and may be secured in two ways: (1) by compelling the preferential use of the defective eye by making it for the time being the better optically of the two; and (2) in suitable cases, directly and consciously using the defective eye in preference to the better one, the other being normally exposed.

The history of a man of twenty who had convergent squint when a child, was wearing correct lenses and with these the eyes were usually almost straight, is given as an illustration of the first of the suggested methods for the cure of the amblyopia and the re-establishment of binocular sight. In the right eye this patient had vision 5/5; in the left eye vision 4/8. When vision was clear in the right eye the left would converge slightly even when wearing the correcting lenses; it was only when the right eye was over-corrected 2 D, that definite fixation was obtained by the left eye. With this over-correction, vision of the right eye was reduced to 3/8 while that of the left eye was raised to 6/8; since he could see more clearly with the defective eye under this correction, his natural inclination led him, after a short time, to use this eye for fixation in preference to the one which he had been accustomed to use. He was not seen for 2 years; then he reported that he had secured easy and complete binocular vision, had retained the acuity on the good side, had developed that of the poor eye until it had become almost normal, and for the first time in his life had been able to use his eyes with comfort. With the restoration of binocular

vision had come a definite mental betterment; as he saw more clearly, he thought more clearly.

The second method is much more difficult psychologically. It can be applied only when the patient is intelligent and willing to cooperate. It consists in the conscious use of the amblyopic eye, the proper refractive correction being employed and both eyes being uncovered. It is exceedingly difficult at first to maintain the fixation of the imperfectly seeing eye. If the better eye is covered and the poorer one allowed to fix, the instant the obstruction is removed the process is reversed. It is so much more comfortable and easy to use the eye in which the sight is clearer. But if the process is repeated, and every conscious effort is made to see by preference with the dull eye, it will be found that this can be done. Fixation can be held, however, only for an instant, the constant tendency being to revert to the accustomed and easy process. Gradually, as the trick is learned it will be found that it is not so difficult a matter as might be supposed to direct the nervous energy consciously to one or the other eye. Then in the course of time, when this faculty has been acquired, it will be found equally possible to hold the two fixation points together, the preponderance of neuricity passing through one or the other of the optic tracts at will. As this progresses vision increases in the defective eye *pari passu*. Finally, binocular vision will be obtained easily and completely without any suppression on one side or the other, and heterophoria will be found to have disappeared.

C. H. M.

DARK ADAPTATION.—WESSELY, K., Würzburg (*Muench. Med. Woch.*, December 7, 1915). The importance of dark adaptation among the soldiers in the field service is just beginning to be recognized and to facilitate a hasty clinical measurement of this condition, W. presents an instrument for the comparative measurement of dark adaptation. As a standard, he uses the eye of the observer who is supposed to have a normal dark adaptation. The measurement lasts about a half hour and does not take the extreme limits. Either daylight or artificial illumination may be employed and the size of the opening admitting light to a number of absorbing plates is used as an index of the dark adaptability of the eye.

H. S. G.

THE VISUAL FUNCTIONS IN INTRAOCULAR HEMORRHAGES AND IN CLOSURE OF THE LIDS.—CORDS, RICH. (From the eye clinic of Prof. H. Kuhnt in the University of Bonn. *Arch. f. Ophth.*, 90, p. 98), reports 3 cases, which showed that after contusions or spon-

taneous hemorrhages into the interior of the eyeball the perception of light of lamps and candles may be entirely abolished, but fair or even normal vision may return after absorption of the blood in the course of weeks and months. It would be wrong to assume detachment of the retina under these circumstances.

As literature contains no quantitative examinations on the absorption of light by blood, C. filled this gap, reaching from his experiments the following conclusions: If aqueous and vitreous are supplanted by blood, at the highest a scarcely noticeable perception of light may be felt if looking directly into the sun. If half of the aqueous and vitreous is replaced by blood, only stronger sources of light (above 25 K) can be recognized immediately in front of the eyes. The light of a stearin candle is not seen if the blood content is 25% and also for stronger sources of light the projection is abolished. In hemorrhages into the anterior chamber candle light is seen in at least 1 m., the projection being indistinct. While through a blood stratum of 0.7 mm. in front of the eye vision is limited to recognizing contours, it is almost normal through a layer of 0.6 mm. In complete ankyloblepharon the light of a stearin candle is well recognized in from 0.5 to 1 m., but the projection even for stronger sources of light is uncertain. C. Z.

Book Reviews

The Description of An Ophthalmoscope.—An English translation of von Helmholtz's "Beschreibung eines Augenspiegels." (Berlin, 1851), by **Thomas Hall Shastid, A. B., A. M., M. D., LL. B., F. A. C. S.,** Cleveland Press, Chicago, 1916.

The translator has fittingly dedicated this little book to Dr. Casey A. Wood, of Chicago. The edition is limited to 500 copies. The book is neatly bound, of convenient size, and easy to read.

The translator has used excellent taste in his transposition, thus rendering the profession a two-fold service: he has given to the English literature a finished translation and to those of us who do not read German an opportunity to understand one of our every day instruments. How many of us know the history of this instrument? Yet here it is written with foot notes bringing it up to date. One paragraph stands forth in this book. This review would fail, did it not include the words of Helmholtz, "In brief, I believe that I may hold the expectation not to be exaggerated, that all the alterations of the vitreous body and of the retina which, until now, have been found in cadavers, will also permit of recognition in the living eye—a possibility which appears to promise the most remarkable advances for the hitherto undeveloped pathology of this structure." The translator in a foot-note says, "Probably the most significant sentence ever penned by an ophthalmologist."

This book, dealing with one of the greatest discoveries in ophthalmology, the only translation in any language, is truly an addition to English ophthalmic literature. GEORGE W. SWIFT,

American Encyclopedia and Dictionary of Ophthalmology. Cleveland Press, Chicago.

Vol. VIII of the Encyclopedia of Ophthalmology, by Casey A. Wood, contains subjects from "H" to "Institutions for the Blind." Included are the biographies of many ophthalmologists, among them two from Chicago, whose life work was so intimately associated with Rush Medical College and the Illinois Eye and Ear Infirmary, Drs. Holmes and Hotz. Again the biographies of three men associated with ophthalmology yet not renowned exclusively for their work in our branch of medicine,—Hutchinson, Horner, and Helmholtz, are also included.

Special mention should be made of the articles on Heredity, Hemipopia, Herpes Zoster, Hospitals, Hysteria, Homeopathy, His-

tology of the Eye, Illuminations, Injuries to the Eyes, and Institutions for the Blind.

The article on Injuries to the Eyes, by Würdemann of Seattle, covers 166 pages, well classified and illustrated. It is in itself a small book upon this subject.

Vol. VIII will be received with great pleasure by the profession.

GEORGE W. SWIFT.

Applied Immunology, the Practical Application of Sera and Bacterins Prophylactically, Diagnostically and Therapeutically, With An Appendix On Serum Treatment of Hemorrhage, Organotherapy and Chemotherapy.—Thomas, B. A., and Ivy, R. H., Philadelphia: 359 pp. with 5 colored inserts and 68 illustrations in text. Philadelphia and London, J. B. Lippincott Co.

This well gotten up work will be heartily welcomed not only as an excellent exposition of the essential facts of immunology but also as a reliable adviser in the practical application of the different methods. The authors themselves state that "the primary object has been to crystallize and detail the practical phases of serum and bacterin application in medicine, thereby enabling the student and general practitioner, with even a slight laboratory experience, to appreciate the significance of, and more competently apply the principles underlying, immunology. In order to render the treatise more complete allusion has been made in places to certain allied substances that have been utilized from time to time in attempts at immunization with a consideration of their merits and demerits."

After an introduction on immunity, immunization, natural and acquired immunity, the subject matter is divided into chapters, to mention only a few, on antigens and antibodies, anaphylaxis, antitoxic and antibacterial sera, agglutinins, precipitins, lysins, fixation of complement, miscellaneous biochemical reaction, etc. The tuberculin therapy and the application of bacterial inoculations are described in detail, considering in succession the different organs and diseases amenable to it, prophylactically and therapeutically. In an appendix the serum treatment of hemorrhage, organotherapy and chemotherapy are excellently presented with many illustrations. Therapeutic dose tables are given, and the glossary at the end will be a great help by its accurate definitions to many who are not familiar with the terminology of this recent branch of medicine. All in all the practical and useful book deserves the heartiest recommendation.

C. ZIMMERMANN.

Infection and Immunity, a Textbook of Immunology and Serology for Students and Practitioners.—Simon, Charles E., Baltimore, Md. Third edition, revised and enlarged, illustrated. Lea & Febiger, Philadelphia and New York.

The object of S.'s work is to present to the practicing physician the more important data which have already been worked out with regard to the questions: How does infection primarily take place, how does infection give rise to disease and how does the animal body overcome infection. It deals with the study of the principles underlying the interaction between the disease-producing agent and the affected organism, which is the domain of immunology. After a very lucid introduction the single chapters present in very clear language the nature of infection, the offensive forces of the invading microorganisms, bacterial substances of the blood, antigens and antidotes, the side-chain theory, the different types of immunity, anaphylaxis and its relation to disease, active and passive immunization, chemotherapy and the application of immunological principles to diagnosis. Here the Widal reaction, Wassermann's reaction, the biological blood-test, Abderhalden's test, the different tuberculin tests of Koch, von Pirquet, Calmette, and Moro, the luetin reaction and gonococcus reactions are described with illustrations.

The book contains all that is essential to know in this intricate subject and gives a splendid systematic instruction in immunology. By the bibliographies at the end of each chapter it is a valuable guide to further reading. The heavier type of the headings of the single paragraphs greatly facilitate orientation, as well as the table of contents and the alphabetical index. C. ZIMMERMAN.

Diseases of the Retina.—Leber, Th., Heidelberg. Graefe-Saemisch-Hess, Handbuch der gesamten Augenheilkunde, second, entirely new, edition. Nos. 248 to 254, p. 748 to p. 1330, with numerous illustrations. Leipzig. Wilhelm Engelmann, 1915. 14M. \$3.50.

Concluding the chapter on tuberculous affections of the retina, the author says that in not too far advanced cases satisfactory results may be attained by careful cures with new tuberculin. Then the affections of the retina in leprosy and the inflammations and degenerative processes of the retina in diseases of other organs and general disorders are discussed, of which those in diseases of the kidneys occupy 143 pages.

Since albuminuria in itself has nothing to do with the retinitis and not every retinitis in which albuminuria occurs, is caused by nephritis, L. considers it more correct to speak of nephritic instead

of albuminuric retinitis. First the ophthalmoscopic changes of the three stages, of hyperemia and inflammation, infiltration, fatty degeneration and retrogression and atrophy are presented with illustrations. The radial arrangement of the spots is not sufficiently explained, but may be caused by the anatomical structure of the retina. They consist of accumulations of granular fat cells in the external layers of the retina, which may also ophthalmoscopically be recognized by the blood vessels coursing over them.

Then the visual disturbances, special forms of the disease, e. g. hemorrhagic form, papillitis, the anatomo-pathological changes of the retina with numerous illustrations, alterations of the blood vessels of the chorioid, course and termination, complications, uræmic attacks, detachment of the retina, secondary glaucoma, occurrence in different types of the renal disease, frequency, etc., are discussed.

In the very interesting chapter on pathogenesis L. assumes with great probability that retinitis occurs only if the disturbance of the renal function has led to increased arterial pressure and hypertrophy of the left ventricle and if in consequence of renal insufficiency regressive products of metabolism are retained. While he admits that the uræmic phenomena may be explained by increased pressure of the cerebrospinal fluid, he thinks that Cushing and Bordley go too far by extending such an explanation also to albuminuric retinitis. The great difference of the typical clinical aspect from that of choked disc and the complete lack of characteristic cerebral symptoms in the majority of cases decidedly indicate a different origin. From discussing these points L. concludes that the assumption of peculiar disturbances of circulation suffices for the explanation of the phenomena and shows how the process may be interpreted.

With similar thoroughness the affections of the retina in diabetes, leukemia and pseudoleukemia, intense anemia and chlorosis, diseases of the liver, gout, and oxaluria, are treated, then the local diseases of the retina, which cannot be attributed to an ectogenous or endogenous infection or any other disease of the body: diffuse chronic retinitis, adhesive chorio-retinitis and external retinitis, pigment degeneration of the retina and related affections, family amaurotic idiocy, retinitis circinata, retinitis exudativa, and pseudonephritic affections.

As we mentioned in our reviews of the preceding instalments also here numerous clinical histories of cases observed by the author and from literature are interwoven in the text of this admirable

exhaustive work, and very complete bibliographies are added to the different chapters. C. Z.

The Diseases of the Orbit.—Birch-Hirschfeld, A., Koenigsberg. **Graefe-Saemisch-Hess**, Handbuch der gesamten Augenheilkunde, second, entirely new, edition. Nos. 268 and 269. Leipzig. Wilhelm Engelmann, 1915. 4M. \$1.00.

These numbers deal with the parasites of the orbit, viz., echinococcus, cysticercus, filaria Loa, dermatobia noxalis and trichina spiralis; cysts in microphthalmus, anterior and posterior cephalocele, acquired serous cysts of the orbit, dermoid cysts, teratoma and the bony tumors of the orbit, viz., exostosis, hyperostosis and encapsulated osteoma. To avoid confusion, B. applies the term osteoma not to all osseous tumors of the orbit, as it has been frequently done, but only to osteomas of the nasal sinuses, which affect the orbit secondarily. As the osteomas of the different nasal sinuses greatly differ in clinical, prognostic and therapeutic respects, they are discussed separately.

Of all the osteoma of the frontal sinus has the greatest importance with regard to participation of the orbit. B. found in 236 cases of osseous tumors of the orbit, 118 cases of osteoma of the frontal sinus, 53 of the ethmoidal, 6 of the supramaxillary and sphenoidal, and 7 of several sinuses.

In all chapters of the valuable monograph the diagnosis, clinical aspect, pathogenesis, pathological anatomy, and treatment, are exhaustively discussed, with utilization of literature and clinical histories of B.'s own observation with descriptions of operations.

C. ZIMMERMANN.

Obituary

BENJAMIN L. MILLIKEN.

Dr. Benjamin L. Milliken, for many years a leading ophthalmologist of Cleveland and for more than thirty years an eminent member of the medical profession, died January 8th, 1916. He was born at Warren, Ohio, December 24th, 1851, thus being sixty-four years at the time of his decease. After graduating from Allegheny College in 1874 and from the Medical Department of the University of Pennsylvania in 1879, he pursued post graduate courses abroad. Returning to this country, he served as resident physician in the University of Pennsylvania, late in the Philadelphia Children's Hospital and finally in the Wills Eye Hospital in the same city before going to Cleveland to render the splendid service of his more mature years.

In 1883 he became Professor of Disease of the Eye in the Medical Department of Western Reserve University and was Professor Emeritus at the time of his death. He served as Visiting Ophthalmologist to St. Vincent's Hospital in 1884 and to the Lakeside Hospital from 1892 to 1912, being Senior Visiting Ophthalmologist to Lakeside Hospital from that date until his decease. In 1900 he was made Dean and Executive Officer of the Medical Faculty of Western Reserve University, retiring from this appointment in 1912. With his co-workers on the faculty he gave a splendid service during these years of marked development in both hospital and medical school, raising the standard of scholarship so that entrance to the medical course depended upon college graduation, and raising the endowment of the medical department ten-fold during these twelve years.

Doctor Milliken was for many years actively interested in the Cleveland Medical Library Association, his wise and kindly advice being a very considerable factor in its successful development. He was President of the Library for two years, filling this position at the time of his death.

He is survived by his widow, Julia Severance Milliken, and five children.

Notices

Applications may now be made for the fellowship in eye, ear, nose and throat at the University of Minnesota. The appointment is soon to be made of an additional "Fellow." This position covers a period of three years, during which the student devotes his entire time to the preparation as a specialist in eye, ear, nose and throat, taking courses in laboratory and clinical branches that are offered, and serving as an assistant in the clinic. At the expiration of the three years' service and satisfactory work, the degree Doctor of Science (in Ophthalmology and Oto-Laryngology) is granted. The fellowship carries with it an honorarium of \$500 the first year, \$750 the second year and \$1,000 the third year. Requirements for admission are limited to those who have a bachelor's degree or its equivalent, as well as the degree of Doctor of Medicine from an acceptable institution with one year's experience as an interne in a hospital of recognized standard or its equivalent. Applications should be made to Dr. Frank C. Todd, Chief of the Division of Eye, Ear, Nose and Throat, or to Dean Daniel Ford of the Graduate Department of the University of Minnesota.

OPHTHALMOLOGY

ESSAYS, ABSTRACTS and REVIEWS

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Original Articles.

MISCELLANEOUS EXPERIMENTS ON THE EFFICIENCY OF THE EYE UNDER DIFFERENT CONDITIONS OF LIGHTING.

C. E. FERREE AND G. RAND,
BRYN MAWR COLLEGE.

As one feature in the work of a preceding paper ("The Efficiency of the Eye Under Different Conditions of Lighting," (*Ophthalmology*, Vol. X, July, 1914, p. 622) we undertook to determine the most favorable intensities for the three types of lighting we had selected for investigation—direct, semi-indirect and indirect, and the effect of varying intensity with the particular grouping of distribution factors* represented in each case. This work was completed for the direct and semi-indirect systems, but not for the indirect. In the present paper results will be given for a similar series of experiments pertaining somewhat more broadly to the hygienic employment of the eye.

The tests are made in the same room, with the same fixtures, and in general with the same conditions of installation and methods of working as were employed in the work of the preceding paper. To secure the various degrees of intensity needed, tungsten lamps of different wattages were used. The series began with 25-watt lamps and included 25, 40, 60 and 100-watt lamps. The results of these experiments are given in Chart 1. In this chart are also included for the sake of comparison graphic representations of the results obtained by a similar variation of intensity for the direct and semi-indirect systems. In drawing conclusions from these results the effects on the eye should of course be correlated with the illumination effects produced. For a full specification of these effects, also those treated in the next paragraph, see Transactions of the Illuminating Engineering Society, 1915, X, pp.

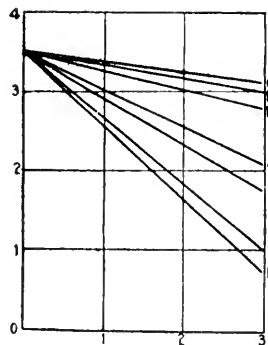
*The distribution factors are evenness of illumination, evenness of surface brightness, diffuseness of light and angle at which the light falls on the work.

CHART I.—INTENSITY SERIES.

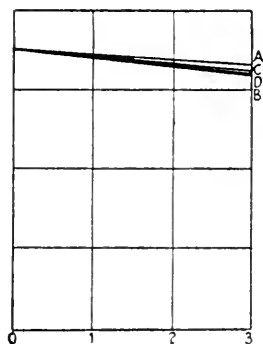
Showing a comparison of the effect on visual efficiency or power to sustain clear seeing of varying the intensity of light for the four installations of lighting used: the indirect, semi-indirect and direct systems, 8 lamps; and the direct system, 16 lamps.¹

Lighting system: Semi-indirect
Foot-candles

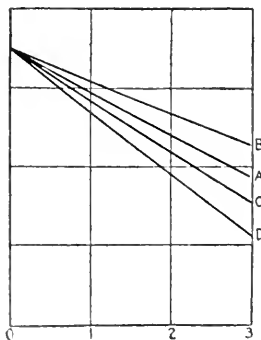
Watts	Volts	Hori- zontal	Verti- cal	45°
A 200	107	1.6	0.45	1.15
B 200	110	1.72	0.484	1.29
C 320	107	2.2	0.58	1.52
D 320	110	2.31	0.62	1.61
E 480	107	3.3	0.94	2.4
F 800	107	6.8	1.82	4.5
X 760	107	5.8	1.45	4.0

Lighting system: Indirect
Foot-candles

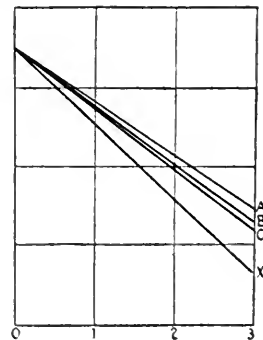
Watts	Volts	Hori- zontal	Verti- cal	45°
A 200	107	1.33	0.39	0.87
B 320	107	1.7	0.49	1.08
C 480	107	3.0	0.765	1.97
D 800	107	5.2	1.36	3.5

Lighting system: Direct (8 lamps)
Foot-candles

Watts	Volts	Hori- zontal	Verti- cal	45°
A 120	107	0.64	0.32	0.49
B 200	107	1.16	0.45	0.85
C 320	107	1.97	0.65	1.39
D 480	107	2.6	1.02	2.0

Lighting system: Direct (16 lamps)
Foot-candles

Watts	Volts	Hori- zontal	Verti- cal	45°
A 240	107	1.23	0.54	0.935
B 365	107	1.6	0.6	1.33
C 400	107	1.86	0.8	1.46
X 880	107	4.2	1.41	2.6



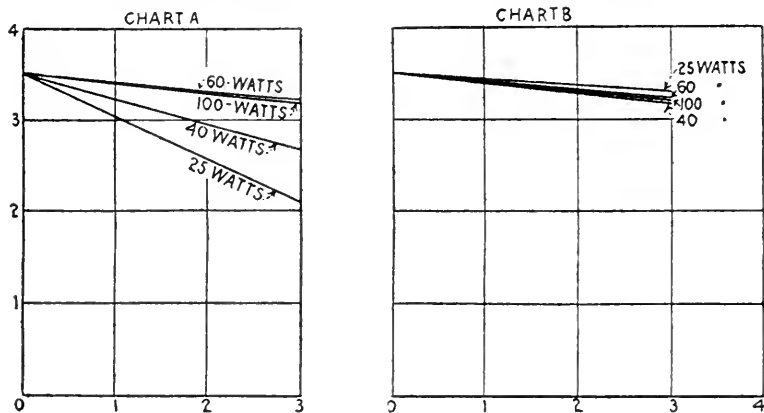
434-442 and 469-473. For the semi-indirect installation it will be seen that the eye fell off heavily in the power to sustain clear seeing for all intensities with the exception of a very narrow range on either side of 2.2 foot-candles measured at the point of work with the receiving test plate of the photometer in the horizontal plane. (In lighting practice 5 foot-candles is usually recommended as the value to be given to this component of illumination for ordinary work.) For the direct installation no intensity could be found for which the eye did not lose a great deal in power to sustain clear seeing as the result of work. For the indirect installation, however, it was found to be possible to use a comparatively wide range of intensities without causing the eye to suffer any considerable depression of functional power as measured by the test.

As was the case for the semi-indirect reflectors used in the work of the preceding paper, socket extenders had to be used with the 25 and 40-watt lamps. That is, without the extenders these lamps owing to their smaller size came so low in the reflector as to change the distribution effects given by the reflectors. For example, without the extenders for these shorter lamps, the spot of light on the ceiling was made smaller and correspondingly more brilliant. It was considered to be a point of interest in relation to the general problem to determine whether this comparatively small change in illumination would cause any difference in the eye's ability to hold its power to sustain clear seeing. A comparison of the results for the indirect reflectors with and without socket extenders is shown in Chart II.

Also in addition to the work on the distribution series reported in the previous paper it was decided to make a test of the effect on the eye of position in the room for the three systems of lighting for one of the intensities of light employed. Accordingly four representative positions in the median line of the room were selected: positions at which respectively six, four, two, and no lighting units were in the field of view. This variation of position at which the observation was made accomplishes two purposes. (1) It gives a more representative idea of the difference in the effect on the eye of the three types of lighting employed; and (2) it shows the effect of varying the number of surfaces in the field of view presenting brightness differences, more particularly the number of primary sources. As usual the intensity of light was as nearly as possible equal at the point of test for these installations, and a supplementary specification was given of the lighting effects in the remainder of the room (see *Trans. I. E. S.*, 1915, X, pp. 414-

CHART II.—INTENSITY SERIES.

Showing the effect on loss of visual efficiency or power to sustain clear seeing of changing the height of the light source in the reflector of the indirect lighting fixtures. The effect on surface brightness is primarily to change the area and surface brilliancy of the spot of light thrown on the ceiling. Chart A shows the results when height of source in the reflector is changed; Chart B, the results when the height is kept approximately constant.

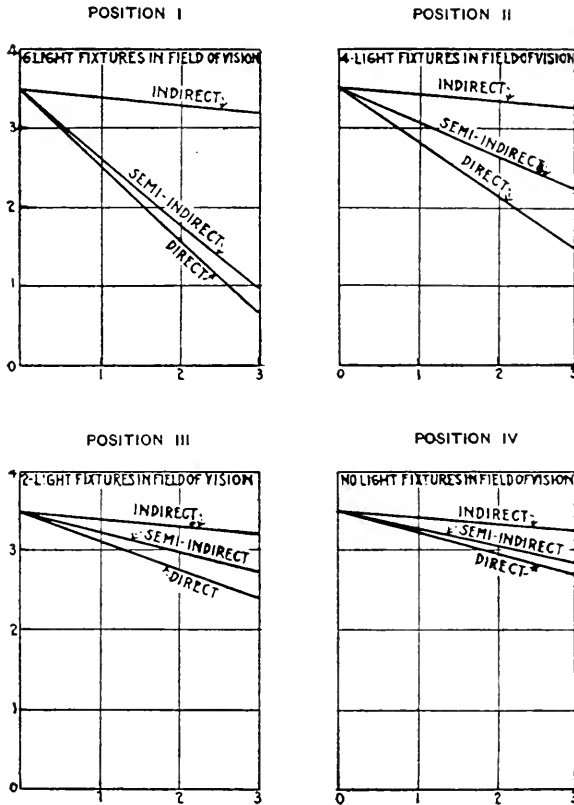


422 and 452-466). The lamps employed totaled 800 watts for the indirect system, 760 for the semi-indirect system, and 880 for the direct. An inspection of the tables of measurements referred to above shows in general a falling off in the magnitude of brightness differences for all systems from Positions I-IV. This falling off, however, is greatest for the direct system, next greatest for the semi-indirect system and least for the indirect. Thus there is not only a decrease in the number of surfaces in the field of view showing a high brilliancy from Positions I-IV, but also a decrease in the magnitude of brightness differences between the surfaces of high brilliancy and the test card, between these surfaces and the reading page, etc., especially for the direct and semi-indirect systems. An inspection of the chart for loss of efficiency shows, roughly speaking, a correspondingly marked decrease in loss of efficiency from Positions I-IV for the systems which show the marked decrease in brightness differences, that is, for the direct and semi-indirect systems. The decrease in loss of efficiency is, it will be noted, practically nothing for the indirect system. Thus not only much less loss of efficiency is sustained by the eye for the indirect units used, but the results are much more independent of the position of the observer in the room.

The comparative effects on the eye for the four positions in the room are shown in Chart III.

CHART III.—DISTRIBUTION SERIES.

Showing the effect on loss of visual efficiency of varying the observer's position in the room, or the number of bright sources, primary and secondary, in the field of vision.



In constructing the above charts the figure expressing the ability to sustain clear seeing during the three-minute record before and after work is plotted along the ordinate and the hours of work along the abscissa. These two points are connected by a straight line the slope of which gives a graphic representation of the change in the power of the eye to sustain clear seeing from the beginning to the end of the three-hour period. During the working period the observer read steadily from uniform type and paper. In the selection and use of the observers for the work the following are some of the precautions that were taken. Care was exercised in the first place to choose only those that had already shown a satisfactory degree of precision in other work in physiological optics and whose clinic record showed no uncorrected defects of conse-

quence. All were under 30 years of age. Before being allowed to take part in the actual work of testing, each observer was trained to a satisfactory degree of precision for the three-minute acuity record under a given lighting condition and in the three-hour test for several of the conditions which were to be tested. In the actual work of testing the results were compiled from several observations and the precision checked up by the size of the mean variation. No results were accepted as significant unless the variations produced by changing the conditions to be tested were largely in excess of the mean variation or mean error for each condition tested. This, the accepted conventional check on the influence of variable extraneous factors, was carefully applied at each step of the work.

In our choice of the first set of conditions to be tested, it will be remembered from our previous work that our purpose was to make a selection that would give a wide variation in illumination effects. The direct reflectors chosen were not of the most modern make, although they may be said to give effects very similar to much of the lighting in actual use at the present time. They were of porcelain ware 16 inches in diameter and only slightly concaved. When placed above the lamps employed (clear tungsten) they served merely to distribute the light to the working plane. No protection from the brilliancy of the light source was afforded to the eye. For the semi-indirect system inverted alba reflectors, 11 inches in diameter, were employed. These reflectors were of modern design and represent very well glassware of medium density. In case of the indirect system corrugated mirror reflectors were used enclosed in brass bowls. These reflectors were also of modern design and give effects which may be taken to represent very well those obtained in good indirect lighting. In later papers results will be given for the smaller differences in illuminating effects that may be obtained by using semi-indirect and direct reflectors differing in density and design. A large number of reflectors will be used chosen with special reference to their representative character by designers of both classes of reflectors. A great deal of this work has already been completed.

Eye Shade Series.

This series of experiments has been conducted for the following reasons: (1) In general two methods are used to protect the eye from the source of light, eye shades and lamp shades. It is desirable to know whether the eye is protected equally by both; and if the eye shade can be substituted for the lamp shade, what type of shade would best serve the purpose. (2) And the statement has

been made to us many times that with an eye shade the three systems of artificial lighting we have used should give equally good results; and results, moreover, as good as those given by the indirect system without an eye shade. There are in general two classes of eye shades, the translucent and the opaque. Up to this time we have confined our work to the opaque shade. So far as we know, it is customary to make the opaque shade with a dark lining. This kind of lining is employed probably because of some notion that it is restful to the eye to darken as much of the field of vision as is possible.*

The tests were begun with the opaque shade with the dark lining. What we found as the result of these tests was somewhat in contradiction to the predictions that had been made. The shade did give pretty nearly the same results for the three systems, but it did this contrary to prediction by improving direct and semi-indirect systems and making worse, by an almost equal amount, the indirect system. That is, protected by the opaque shade the eye lost in efficiency for the three systems by an amount somewhere near the mean of the losses experienced by it for the three systems without a shade. Nor is this result surprising when one reflects upon the conditions imposed upon the eye by an opaque shade with a dark lining. While it protects the eye from the sources of light, such a shade does not by any means eliminate harmful brightness differences in the field of vision. It in fact creates for the eye a very unnatural brightness relation, i. e., it renders the whole upper half of the field of vision dark in sharp contrast with the brightly lighted lower half. The direct effect of this is a strong brightness induction (physiological) over the lower half of the field of vision which manifests itself to the observer by causing glare in surfaces which have no glare and by increasing the glare in surfaces in which glare is already present. This it is scarcely necessary to point out, operates against the discrimination of detail and puts the eye under strain to see its objects clearly. Moreover, the unusual and strongly irregular character of the image formed on the retina probably also sets up a warfare in the incentives given to the muscles which adjust the eye. That is, the upper half of the field of vision is dark and presents no detail. The effect of this is probably to exert a tendency to cause the muscular relaxation characteristic of the darkened field of vision. The lower half of the field is light

*Another popular view might be, so far as protection to the eye is concerned, to regard the opaque shade as the analogue of the opaque or perhaps the indirect reflector and the translucent shade as the analogue of semi-indirect reflector.

and filled with detail. The incentive here is towards the best possible adjustment of the eye for the discrimination of detail in the object, while the rim of the shade, the sharply marked boundary between the dark and light halves of the field of vision and much nearer to the eye than the objects viewed,* serves as a constant and consciously annoying distraction to fixation and accommodation. These complex and somewhat contradictory impulses given to the muscles of the eye might very well and doubtless do cause an excessive and unnatural loss of energy and efficiency in case of the prolonged adjustment of the eye needed for a period of work.

Early in the course of the tests it occurred to us that we might render the brightness distribution in the field of view presented to the eye wearing a shade, more natural and thereby improve the effect of the shade on the eye, by employing a white instead of a dark lining. By using a mat white paper* with a reflection coefficient of about 75 per cent. for this lining, the following effects were produced. The two halves of the field of vision were rendered much more nearly of equal brightness: the glare in the lower half of the field of vision was very noticeably lessened and the discrimination of detail was correspondingly improved: the upper half of the field of view no longer tended to give to the eye the reflexes of the darkened field of vision: and the rim of the shade did not stand out nearly so distinctly in the field of view to distract accommodation and fixation. That is, the whole lining of the shade was darkened just enough by being shielded from the light of the room by the shade itself to make it nearly equal in brightness to the rest of the field of vision. The effect of this was to make the shade merge into the field of view rather than to stand out distinctly from it. A shade to give the best effects should be seen as little as possible. It thus offers a minimum of distraction to the proper adjustment of the eye for its work.

The results of the test for loss of efficiency show, moreover (See Chart IV), that our surmise with regard to the effect on the eye of this change in the lining of the shade was correct. The action of the white lining was greatly to improve the ability of the eye to maintain its efficiency for a period of work. As good results were not gotten, however, with the shade for any of the systems as were given by the indirect system without the shade. Since there was a still greater evenness of surface brightness in the field

*This rim is about three inches in front of the observer's eye when the shade is in position.

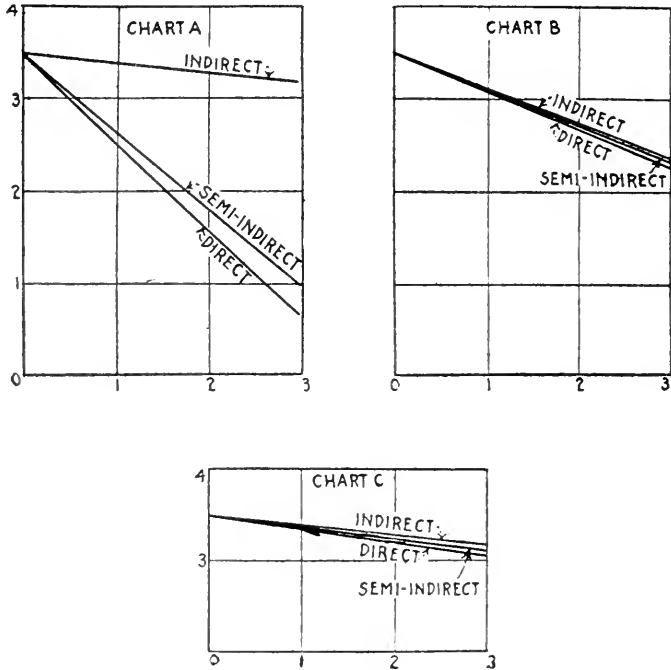
*Hering standard white paper was used for this lining. The reflection coefficient of the dark lining was about 6-8 per cent.

of view in case of the indirect system with the eye shade than without, the question arises why at least as good results were not obtained with the shade as without. The answer, we believe, is to be found in terms of the distraction to fixation and accommodation caused by the eye shade even when a light lining was used. For the effect of a shade on the eye even when the most favorable lining is employed is that of a constantly present distracting object with its lower margin not far removed from the center of the field of vision, and much nearer to the eye than are the objects which the observer is called upon to discriminate. Without doubt the best results cannot be obtained without changing also the shape or design of the shade. It will be noticed also in Chart IV that the results were never so good for either kind of shade for the direct and semi-indirect systems as for the indirect. Since the evenness of surface brightness in the field of view was not very different for the three systems in both cases, this again probably indicates that the evenness of surface brightness is not the only one of the distribution factors that has to be taken into account in studying the effect of different conditions of lighting on the eye.

As yet we have not determined the effect of translucent shades on the eye. In attempting to deal in a general way with this class of shades we have the same type of difficulty to face that we have in case of the semi-indirect reflector. That is, we may have shades varying from translucent to opaque and sharing in the merits and demerits of each extreme. Our judgment would be, however, that it would be very difficult to get a translucent shade that would give as good results as the opaque shade with a light lining; for the translucent shade when made sufficiently opaque to give the needed reduction to the image of the source will darken too much the upper half of the field of vision and thereby simulate too much the condition given by the opaque shade with the dark lining to give the best results for comfortable and efficient seeing. Moreover, from the results that have already been obtained with the opaque shade and from the principles it seems fair to infer from these results it seems very probable to us that as good effects for seeing should not be expected from the use of any kind of eye shade as may be gotten from lamp shades. That is, if we are to secure the best results for seeing, the shade should be put on the lamp, not on the eye. However, the relative inexpensiveness of eye shades, their independence of the limitations which militate against the use of certain types of lamp shades, their ready availability to those who have the least chance to escape from the effects of

CHART IV.—EYE SHADE SERIES.

Showing the effect on loss of visual efficiency or power to sustain clear seeing of opaque eye shades with dark and with white lining for the installations direct, semi-indirect, and indirect with the same intensity of light at the point of work. Chart A shows results without shade; Chart B, with shade having dark lining; Chart C, with shade having white lining.



bad lighting, namely the subordinate and the employee, should constitute a strong incentive for the development of this type of protection to the eye as a provisional and immediate aid in solving the problem of bad lighting.

For a fuller statement of results and a specification of the illumination and brightness measurements and brightness ratios that should be taken into account in considering the results of the tests, see Transactions of the Illuminating Engineering Society, 1915, X, pp. 475-483.

The Angle at Which the Light Falls on the Work.

The object of these experiments was to find out whether the difference in the angle at which the light falls on the work produces an effect on the eye that can be detected by the test we have used for loss of efficiency. For the purpose of this preliminary investigation it was decided to make the general illumination of the

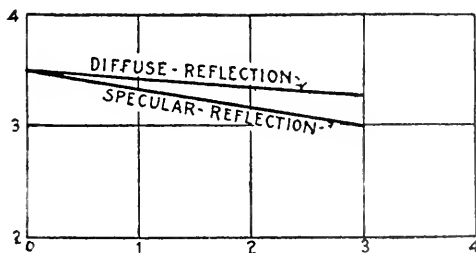
room such as to cause the eye little loss of efficiency as the result of a period of work; and to add to that at the point of work a component of light which was less diffuse in order that the amount of light entering the eye would be more dependent upon the angle at which the reading page was held.

The general illumination was obtained from the indirect system used in the work of the preceding sections with lamps totalling 800 watts. The less diffuse component at the point of work was obtained from a 60-watt lamp with a porcelain reflector of the desk lamp type. This lamp was turned into the horizontal position and was placed behind the observer and to the left so that the light came over the left shoulder. When in the position for which the test was taken, the tip of the lamp was slightly above the level of the observer's eye and at a distance of 1 meter from the left eye.

For the specification of the illumination and brightness measurements and the brightness ratios for our test room illuminated by the indirect system 800 watts, see Trans. I. E. S., 1915, X, pp. 469-471. For a specification of the significant changes in these measurements and ratios produced by the addition of the 60-watt lamp behind the observer, see *ibid.* p. 484. The brightness of the reading page in the position that gave the least amount of specular reflection was 0.0059 cp. per sq. in.; and in the position that gave the greatest amount of specular reflection 0.0077 cp. per sq. in. A mirror surface was used as an aid in locating the position of least and greatest specular reflection. The comparative effects on the eye of these two positions of the reading page are shown in Chart V.

CHART V.—THE ANGLE AT WHICH THE LIGHT FALLS ON THE WORK.

Showing the effect on loss of visual efficiency or power to sustain clear seeing of the angle at which the light falls on the work.



*The Effect of Different Conditions of Lighting on the Fixation
Muscles of the Eye.*

The test we have employed thus far in the conduct of our work is one designed to show the effect of different conditions of lighting on the ability of the eye to hold its efficiency for clear seeing for a period of three minutes. In itself this test is not analytical in principle. The results, as is stated above, are expressed in terms of an aggregate loss of function. The contributive factors may be inferred from the nature of the test but the test is not in itself designed to separate them out. And indeed it is a question whether any practical good can accrue to the practice of lighting from a knowledge of just what part of the visual apparatus it is that falls off in function as a result of an unfavorable condition of lighting. Obviously the chief need is to find out what are the conditions that cause the eye to lose its ability to see clearly and to avoid these conditions in planning and installing a lighting system. From the beginning we have had in mind, however, an analysis of effect. Our tests for the sensitivity and functional state of the retina (sensitivity to color and brightness, lag in coming to a full response, rate of exhaustion and rate of recovery) showed, for example, that very little, if any, of the difference in results we have gotten for the four types of lighting we have employed can be ascribed to a loss in the efficiency of the retina, or the light sensitive part of the visual apparatus. Three sets of factors are involved in clear seeing: (1) the sensitivity of the eye to colored and white light; (2) the ability to make fine space discriminations which is in part dependent upon our third factor; and (3) accurate fixation and accommodation. Both fixation and accommodation are the result of muscular action. When the muscles lose in tone because of excessive use or by sharing in a general condition or state of the body, the eye loses correspondingly in its power to sustain clear seeing. If, for example, the muscles of accommodation have fallen off in efficiency, the lens is no longer held in the adjustment needed to bring the light to a sharp focus on the retina and loss of detail and blurring result; or if it be the fixation muscles that have suffered the loss, the eyes cannot be continuously held in such a position that the images of the object viewed fall symmetrically on the fovea of each. When this latter condition is present, loss of detail results from two causes. (1) The fovea and region immediately surrounding it are the most highly developed parts of the retina and the best fitted for the light and space discriminations needed for clear seeing. Moreover, the refracting media of the

eye give the clearest images when the axis of the cone of rays from the object viewed deviates as little as possible, consistent with the mechanism of the eye, from the optic axis. And (2) if the images in the two eyes do not fall more or less symmetrically upon the fovea of each, they are not accurately combined into one, and blurring and loss of detail result from the doubling of the objects seen. It is our purpose as fast as possible to isolate the effect of the three systems of lighting we have used on each of the above named factors. In the work of the present section the effect of these systems on the fixation muscles has been studied only in a tentative and provisional way.

The doubling of the image seen when the fixation muscles lose their power of coordinated action furnishes us with the clue for a test for loss of efficiency of these muscles. That is, just as blurring and loss of ability to discriminate detail is taken as the criterion of the loss of acuity of vision, so will the doubling of the image seen be taken as our index of the loss of the coordinated action of the fixation muscles. If one were to stare continuously for an interval of time with natural vision at a single test object, for example, a vertical line, doubling might be expected especially if there had been protracted strain or considerable loss of power to coordinate. For the purpose of our work, however, greater sensitivity than this would be needed. Obviously sensitivity can be added by putting the eyes under strain to combine their images. When this is done, even when the muscles are fresh, if the object is looked at or fixated for an interval of time it will be seen alternately as one and as two. The proportion or the ratio of the time seen as one to the time seen as two can be regulated by the amount of initial strain under which the eyes are put to combine their images. The regulation of this ratio is empirical and of importance: for as in the case of the test for loss of efficiency for clear seeing, the sensitivity of the test depends to a considerable extent upon the initial value that is given to this ratio. The eyes may be put under strain to combine their images by interposing between them and the object viewed weak prisms and so adjusting them and regulating the distance of the object from the eye that with the maximum of effort to see it as one it is seen alternately as one and as two in

the proportion desired.* In our provisional experiments on this point we found that an adaptation of the Brewster stereoscope afforded a convenient method of putting the eyes under a strain to combine their images. In this case a stereograph consisting of two vertical lines exactly alike may be used as the test object. In the stereograph used in our test the vertical lines were 2.5 cm. long and were printed on the card 4.5 cm. apart or at 2:25 cm. from the center of the card. When this was put in a sliding carrier and was made to approach the eyes, a position was reached at which with the maximum of effort the observer was no longer able to see the two vertical lines as one.* They were seen alternately as one and two. In making the test the hood was removed from the stereoscope so that the eyes were fully exposed to the conditions of the illumination that were being tested. The stereoscope was mounted in front of the eyes of the observer in position at the point of work. The distance of the carrier containing the test object from the observer's eyes was adjusted until the proper ratio of time seen as one and time seen as two was obtained. Having determined

*It is obvious that the greater part of the strain may be put at will upon the internal or external muscles by the proper rotation of the prisms. It will be understood that the work reported above is intended to be little more than suggestive of possibilities.

It would seem also that the principle advanced here might be utilized to advantage by the ophthalmologist as a supplement to his tests of the extrinsic muscles of the eye. The abduction and adduction tests, for example, determine only what the muscles are able to do by momentary effort. Obviously, however, it is not what the muscles are able to do by a momentary effort or jerk that measures their ability to hold the eyes continuously adjusted for work. It is rather their endurance or what they are able to accomplish in an interval of time. An expression may be had for this either for the eyes conjointly or separately by the method described above. That is, prisms may be put in front of either one or both eyes and the ratio be determined of the time the object is seen as one or as two for whatever interval of time the operator may select. Similarly, it seems to the writers that the time element might be introduced to advantage into the visual acuity test used by the ophthalmologist when the cycloplegic is not employed, for example, in cases of post-cycloplegic refraction. Is it enough to know that the eye in these cases has 20/20 acuity or can discriminate a certain standard visual angle by a momentary effort? Would it not give a more complete representation of the functional condition of the eye to know what it can discriminate clearly through an interval of time; or better still perhaps, for what proportion of an interval of time it can discriminate a certain detail or standard visual angle clearly? For example, just as a fatigued eye may for a moment under the spur of the test overcome the functional results of fatigue, so might small errors of refraction be overcome for the moment by muscular effort, especially in the cases in which the muscles of the eye are unusually strong. But just as the fatigued muscle cannot do this through an interval of time, so it would seem that a residual error of refraction might not be so easily masked through an interval of time by means of muscular effort. In short, this form of test is suggested as affording possibly a closer approximation to the conditions and demands imposed upon the eye during a period of work than is afforded by the acuity test based upon the momentary judgment. In making this suggestion, however, we recognize that in the work of the clinic the advantage of such a test may be more theoretical than feasible and practicable.

*The observer, whose results are given in this paper, preferred to have the working position of the sliding carrier beyond the position at which the combination of the two lines was effected the most easily, instead of nearer, as is described above. It is obvious that either position may be used for testing the ability of the muscles to sustain coordination of action.

this position a record was made of the time seen as one and the time seen as two for three minutes at the beginning and close of work. The ratio of these intervals may in either case be taken as a measure at that time of the power of the fixation muscles to act in coordination for three minutes of continuous effort; and the decrease in this ratio from the beginning to the close of work may be taken as a measure of the loss in that power sustained as the result of work. In making this test the same recording apparatus was used as was employed in the test for loss of efficiency for clear seeing. That is, the record was traced on a kymograph by means of an electro-magnetic marker and a telegraph key, and a time line was run underneath the record by means of a Jaquet chronograph registering seconds.

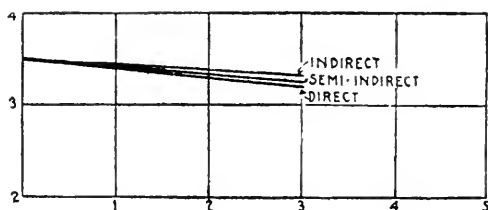
This test was made under the same installations, conditions of work, and with the same observers that were used in the distribution series of the former paper. For a more complete account of this series, see also *Transactions I. E. S.*, 1915, X, pp. 484-490. The test was made at only one of the positions in the room that were used in that series, namely, the position at which the greatest loss of power to sustain clear seeing was obtained. At this point, it will be remembered, six of the lighting units were in the field of view. The specifications of the lighting effects produced by these installations are given *Transactions I. E. S.*, 1915, pp. 452-459. Nothing need be added here to these specifications but the brightness of the stereograph, or the test object, in position for the three systems of lighting, and the illumination measurements at the test object. The brightness of the test object, corrected for the absorption of the prisms of the stereoscope, was for the direct system 0.00172 cp. per sq. in.; for the semi-indirect system 0.00163 cp. per sq. in.; and for the indirect system 0.00167 cp. per sq. in. New illumination measurements were needed at the test object because it had to be moved closer to the eyes than was the case in the tests for loss of power to sustain clear seeing. This brought it into a region of different illumination. These measurements are given in Chart VI. The results of this test for loss of coordinating efficiency of the fixation muscles are given also in this chart. These results show (a) that very little loss of coordination was suffered by the fixation muscles as the result of three hours of work under the systems selected; and (b) that there was very little difference in the effect for the three systems. Since there are no obvious reasons for thinking that this test has not somewhere nearly as great sensitivity as the test for loss of efficiency for clear seeing,

and since the same observers, conditions of lighting and working were used as in the former tests, it does not seem to us at this time that the large differences in the loss of efficiency for clear seeing that is sustained under these conditions, as shown by the former tests, can be ascribed to any great extent to an effect on the muscles of fixation. The point, however, cannot be considered as finally settled because we have not made long enough study of the test itself and the limitations of its application to the study in question to make its results certainly comparative with those of the test for the ability of the eye to sustain clear seeing.

CHART VI.—FIXATION MUSCLE SERIES.

Showing the loss of efficiency of the fixation muscles as the result of a three-hour test under the direct, semi-indirect, and indirect systems of lighting employed.

Lighting system	Watts	Foot-candles		
		Horizontal	Vertical	45°
Indirect	800	4.2	0.99	2.5
Semi-indirect	760	4.8	0.93	2.6
Direct	880	3.9	1.0	1.99



The Effect of Motion Pictures on the Efficiency of the Eye.

The belief that motion pictures subject the eye to undue strain is too prevalent to need more than mention in passing. All are familiar with the conditions—the initially dark-adapted and highly sensitized eye, the comparatively brilliant screen with its dark surrounding field, the flickering light, the shifting and very often unsteady pictures. We have already seen that differences in surface brightness of considerable magnitude in the field of vision cause loss of efficiency and produce discomfort and we have discussed the causes for these effects. We have nothing further to add to that discussion here. We are, however, facing for the first time in our work the question of the effect upon the eye of a flickering light and lack of steadiness in the object viewed. The following reason is suggested why a flickering light or unsteady picture may cause loss of efficiency. The eye is so constituted that when its images lose in clearness or distinctness it is incited to a

muscular readjustment to bring about the clearness needed. Ordinarily in seeing, the conditions for loss in clearness come about primarily through the difference in distance or direction from the eye of the objects which are successively viewed. In motion pictures, however, the changing clearness in the objects viewed is not due to any change in their distance or direction from the eye; nor to anything in fact which the readjustment of the eye can remedy to any considerable degree. The effort expended, therefore, is of little avail for seeing, if indeed the new setting of the parts is not a detriment to clear seeing and a condition which in turn must be corrected. This should, and doubtless does, lead to muscular strain and loss of efficiency. It was decided therefore, to make an explorative investigation to determine whether there is an effect of motion pictures on the eye which can be detected by our test for loss of efficiency. The tests were taken in a local theatre, selected primarily because of the favorable conditions that prevailed. The definition at the screen was good and the pictures were unusually steady and free from flicker. The conditions were, we think, fairly representative of what is found in the better class of moving picture houses.

The tests were taken immediately before and after two hours of observation of the pictures. During the exhibition the observer sat directly in front of the center of the screen. The observation was made at successive times at three distances from the screen—in the front, the middle and the back of the house. These positions were respectively 25, 48 and 71 ft. (7.62, 14.6 and 21.6 m.) from the screen. The room in which the pictures were shown was 78 ft. (23.7 m.) long and 48 ft. (14.6 m.) wide. The tests were taken in a room 14 ft. (4.2 m.) long, 9 ft. (2.74 m.) wide, 11 ft. (3.35 m.) high adjoining the stage. The walls and ceiling of this room were of rough plaster, painted a flat white. When taking the tests the observer sat facing one of the side walls of the room, 1.5 m. distant. The room was lighted for the purpose of the test with one 100-watt and one 60-watt clear tungsten lamp suspended behind and slightly to the right of the observer when in position for the test at about 2 ft. (.66 m.) above the level of his eyes. The source of light was entirely out of the field of view and the light fell evenly and without shadow on the test card and the wall in front of the observer. At the point of the test card, the illumination measured with the receiving test plate of the photometer in the horizontal plane was 1.3 foot-candles; in the vertical plane 1.9 foot-candles; and in the horizontal plane 2.3 foot-candles.

The surface brightness of the test card was 0.003256 cp. per sq. in. The distribution of surface brightness on the wall which the observer faced was very even. At the point of maximum brightness to the right of the observer, as nearly as that point could be located, the brilliancy was 0.00308 cp. per sq. in.; and to the left of the observer, 0.002024 cp. per sq. in.

In order that there might be no intermission between the pictures for changing the films, two projection machines were used. The following is the specification of the apparatus employed, as given by the operator:

Type of machine, Powers 6—A Projector.
 Lens equipment, 1 pair pearl white condensers, $6\frac{1}{2}$ in. F. L., 1 Bausch and Lomb objective combination, $4\frac{3}{4}$ in. E. F.
 Lamp, 1 10,000-cp. adjustable arc.
 Carbons, $\frac{5}{8}$ in. cored bio's.
 Current, 22 volt. a. c. through Halberg transformer.
 Line current, 28-30 amperes.
 Arc voltage, 45-50 volts.
 Length of throw or distance from objective to screen, 72 ft. (21.9 m.).
 Screen, sheet muslin sized and coated with flat white alabastine.
 Speed of film through machine, 66 ft. 8 in. (20.3 m.) per min.
 Number of pictures per 1 ft. (0.3 m.) of film, 16.
 Size of picture on film, $\frac{3}{4}$ in. (1.9 cm.) high by $15/16$ in. (2.38 cm.) wide.
 Size of picture on screen, 11 ft. (3.35 m.) high by 14 ft. (4.26 m.) wide.
 Approximate brightness of screen with film removed from projector, 3.47 cp. per sq. in.

Exceptional steadiness, it may be said, is given to the movement of the film, and therefore to the picture in this type of projector by the special type of intermittent movement that is employed. Details of this movement need not be given here. As has already been stated, our reason for making the test in this particular theatre was the comparative steadiness of the pictures and the comparative freedom from flicker that was obtained.

The results of the test are shown in Chart VII. Quite a great deal of loss of efficiency is shown as the result of two hours of observation. The nearer the observer was to the screen, the greater was this loss found to be. The loss, however, so far as we can tell, is no greater than is caused by steady work under the direct and semi-indirect installation of lighting used in our distribution series. Unfortunately we have not for the purpose of comparison results for the same observer for the same length of time of exposure for the two sets of condition. The loss for Observer R for the two hours observation of the motion pictures was not nearly so great as for the three hours of reading from good print and paper under the direct and semi-indirect systems of lighting. But comparing results for Observer G for two hours of reading from the same type and paper with those for Observer R for two hours' observation of the pictures, the loss seems to be about the same.

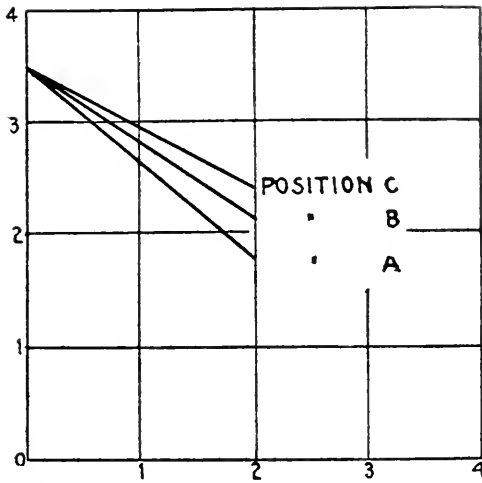


CHART VII.—MOTION PICTURE SERIES.

Showing the loss of visual efficiency or power to sustain clear seeing of the eye caused by two hours observation of motion pictures.

Position A..... 25 ft. from projection screen
 Position B..... 48 ft. from projection screen
 Position C..... 71 ft. from projection screen

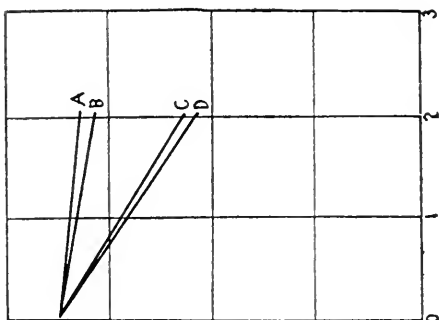
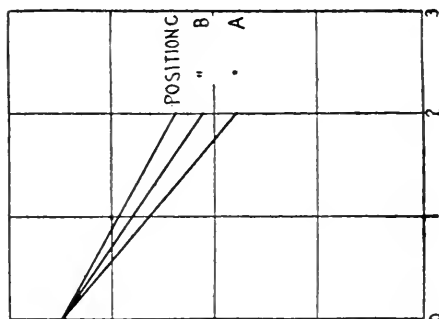
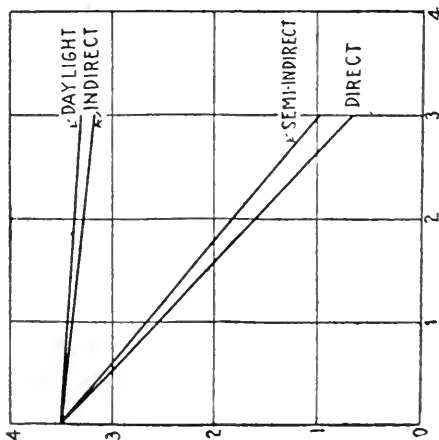
That is, our results indicate that while the eyes are strained a great deal by the observation of moving pictures, even in the better moving picture houses, they are damaged little more by that in all probability than they are by reading steadily the same length of time under the greater part of the lighting that is now in actual use. For the sake of comparing the effect of motion pictures on the eyes with the effect of reading steadily under the direct, semi-indirect and indirect systems of lighting we have employed, Chart VIII has been prepared.

The Tendency of Different Lighting Conditions to Produce Discomfort and a Comparison of the Tendency of These Conditions to Cause Loss of Efficiency and to Produce Discomfort.

In the former papers we have held that the general level or scale of efficiency of the fresh eye, loss of efficiency as the result of work, and the tendency to produce discomfort are all separate aspects of the problem of lighting in its relation to the eye, and that our knowledge of each must be obtained by different methods of investigation. A correlation between these three moments is doubtless possible, but that correlation should be founded upon the results of careful investigation: it should not be assumed. It is our purpose in this section of the paper to show the relative tendency of

CHART VIII.

Distribution Series (Observer R)				Motion Pictures Series (Observer R)				Distribution Series (Observer G)						
Showing the loss of visual efficiency or power to sustain clear seeing as the result of a two hour test under the systems of direct, semi-indirect, and indirect lighting used, and daylight.				Showing the loss of visual efficiency or power to sustain clear seeing caused by two hours observation of motion pictures.				Showing the loss of visual efficiency or power to sustain clear seeing as the result of a test two hour under the systems of direct, semi-indirect, and indirect lighting used, and daylight.						
Lighting system		Foot-candles		Position A, 25 ft. from projection screen.		Position B, 48 ft. from projection screen.		Lighting system		Foot-candles				
Watts	Hor.	Ver.	45°					Watts	Ver.	Hor.	45°			
Daylight	5.5	1.32	4.2		Position C, 71 ft. from projection screen.		A Daylight	5.5	1.32	4.2		
Indirect	800	5.2	1.36	3.5			B Indirect	800	5.2	1.36	3.5	
Semi-indirect	..	760	5.8	1.45	4.0			C Semi-indir't	..	760	5.8	1.45	4.0	
Direct	880	4.2	1.41	2.6			D Direct	880	107	4.2	1.41	2.6



the different conditions of lighting we have used to produce discomfort, and to make a rough comparison of the tendency of each condition to cause loss of efficiency and to produce discomfort. Any comparative study of the conditions producing discomfort necessitates a means of estimating discomfort. It is obvious that the core of the experience of discomfort is either a sensation or a complex of sensations. As such it should have a limen or threshold just as other sensations have; and just as we are able in general to estimate sensitivity in terms of the threshold value, so should we in this case be able to use the threshold value in estimating the eye's sensitivity or liability to discomfort under a given lighting condition. Threshold values are usually determined by finding out how much energy or intensity of a given stimulus, applied for a short interval of time, is required to arouse a just noticeable sensation. This form of procedure, however, is not adapted to the needs of our problem. It is much better to reverse the process and find how long the eye has to be exposed to a stimulus of given intensity to arouse just noticeable discomfort. Our threshold thus becomes a time threshold and is measured in units of time instead of units of intensity. In order to determine whether the judgment of the threshold of discomfort can be made with certainty, and to perfect the method and to test in general its feasibility, an abstract investigation was undertaken first, running through an entire year, in which a better and more convenient control of conditions could be secured than is possible in the investigation of a concrete lighting situation. That is, we undertook to determine the comparative sensitivity of the eye to discomfort when a single source of light was exposed in different parts of the field of vision. In order to carry out that investigation a lamp house with a circular opening in one side 3 cm. in diameter was attached to the arm of a perimeter in such a way that the opening was always directed towards the observer's eye. In the lamp house could be placed a lamp of whatever candlepower was desired. The arm of the perimeter could be shifted to any meridian in which it was desired to work and the lamp house could be moved at will along this arm. It was thus possible to expose the light for any length of time in any part of the field of vision that was desired. Working in this way we have not only investigated the effect of many types of variation of the position of the light in the field of view, the effect of intensity of light, etc.; but we have studied and standardized the factors that influence the sensitivity and reproducibility of the judgment and have given our observers the training that

was needed for the concrete investigation. In making the concrete investigation we have used every variation of the conditions of lighting described in this and the preceding paper. That is, the tendency to produce discomfort, measured in terms of the time threshold, has been determined for all the conditions of lighting we have used in the tests for loss of efficiency. Two cases of the investigation may be made—a determination of the tendency to cause discomfort when the eye is at rest, and a determination of this tendency when the eye is at work. Both of these cases were included in our investigation. The following determinations were made. (a) The time threshold of discomfort was gotten when the observer was sitting with the accommodation muscles relaxed and with the fixation muscles as nearly relaxed as was practicable under the conditions; that is, the observer sat in the positions used in the distribution series (one with six, one with four, one with two and one with no fixtures in the field of view) and took an easy fixation of an area at the level of the eye on the opposite wall of the room. The fixation distance, for example, for the first of these positions was 22 ft. Since blinking was found to be one of the variable factors which influence the tendency to produce discomfort, the amount of blinking was made constant from test to test. This was accomplished by having the observer blink at equal intervals during the test, timing himself by means of the stroke of a metronome. The interval most natural and suitable for this purpose was determined for each observer separately. In the results given in the following table a three-minute interval was used. And (b) the time threshold of discomfort was determined when the observer was reading from print and paper similar to that used in the loss of efficiency tests. In these tests all the conditions were kept as nearly the same as they were in the work on loss of efficiency as was possible. The results of both of these sets of experiments on the tendency to produce discomfort are shown in Tables I-IV. The tendency to produce discomfort should be estimated, roughly speaking, probably as inversely proportional to the time it was required for discomfort to be set up. The time required for discomfort to be set up is given in the tables. In order to make convenient a comparison of the tendency of the various conditions of lighting to cause loss of efficiency and to produce discomfort, the percentage loss of efficiency caused by the given lighting condition is given in a parallel column in each table. The percentage loss of efficiency was computed by dividing the loss in the ratio of time seen clear to time seen blurred sustained as a result of

TABLE I.—DISTRIBUTION SERIES.

Showing a comparison of the tendency of the direct, semi-indirect, and indirect installations of lighting used in the distribution series to cause loss of visual efficiency or power to sustain clear seeing, and to produce discomfort. The loss of efficiency is the result of a three hour test. The tendency to produce discomfort is estimated by the time required for just noticeable discomfort to be set up.

Position of observer	Lighting system	Watts	Foot-candles		Per cent. loss of efficiency	Time limen of discomfort in seconds (not reading)	Time limen of discomfort in seconds (reading)
			Horizontal	Vertical			
I.	Indirect	800	5.2	1.36	8.6	263	100
	Semi-indirect	760	5.8	1.45	72.0	15	8
	Direct	880	4.2	1.41	81.0	10	9
II.	Indirect	800	5.1	1.98	6.3	259	103
	Semi-indirect	760	6.1	2.5	37.0	26	14
	Direct	880	4.65	2.75	58.3	20	13
III.	Indirect	800	3.9	2.1	7.7	255	99
	Semi-indirect	760	5.0	2.6	22.0	120	35
	Direct	880	4.0	2.9	31.0	55	24
IV.	Indirect	800	2.9	2.1	6.6	265	101
	Semi-indirect	760	3.4	3.0	19.0	240	87
	Direct	880	3.0	3.4	23.0	235	57

TABLE II.—INTENSITY SERIES.

Showing a comparison of the tendency of the direct, semi-indirect and indirect installations of lighting for the different intensities used in the intensity series to cause loss of visual efficiency or power to sustain clear seeing, and to produce discomfort. The loss of efficiency is the result of a three hour test. The tendency to produce discomfort is estimated by the time required for just noticeable discomfort to be set up.

Lighting system Watts	Foot-candles			Per cent. loss in efficiency	Time limen of discomfort in seconds (not reading)	Time limen of discomfort in seconds (reading)
	Horizontal	Vertical	45°			
Indirect						
800	5.2	1.36	3.5	8.6	263.0	100
480	3.0	0.765	1.97	8.0	265.0	103
320 (with socket extenders)	1.7	0.49	1.08	9.1	256.0	98
200 (with socket extenders)	1.48	0.407	0.95	5.7	251.0	104
320 (without socket extenders)	1.33	0.39	0.87	23.0	50.0	33
200 (without socket extenders)	1.16	0.37	0.76	40.0	20.0	14
Semi-indirect						
320	2.2	0.58	1.52	11.4	102.0	35
200	1.6	0.45	1.15	40.9	62.0	16
480	3.3	0.94	2.4	50.0	50.0	15
760	5.8	1.45	4.0	72.0	15.0	8
800	6.8	1.82	4.5	78.0	14.0	3
Direct (16 lamps)						
240	1.23	0.54	0.935	57.4	23.5	17
365	1.6	0.6	1.33	62.0	14.0	11
400	1.86	0.8	1.46	65.0	12.0	11
880	4.2	1.41	2.6	81.0	10.0	9
Direct (8 lamps)						
200	1.16	0.45	0.85	34.3	56.0	27
120	0.64	0.32	0.49	45.5	52.0	15
320	1.97	0.65	1.39	55.5	23.0	13
480	2.6	1.02	2.00	67.0	20.0	12

work by 3.5, the standard ratio to which all the ratios at the beginning of work were reduced. A rough correspondence of the tendency to produce discomfort and to cause loss of efficiency will be noted in every case. This correspondence by no means amounts to a 1:1 correlation, however. In Table I is given the comparison of the tendency to cause loss of efficiency and to produce discomfort for the distribution series; in Table II for the intensity series; in Table III for the eye shade series; and in Table IV for the series showing the effect of the angle at which the light falls on the work.

TABLE III.—EYE SHADE SERIES.

Showing a comparison of the tendency of the direct, semi-indirect, and indirect installations of lighting used in the distribution series to cause loss of visual efficiency or power to sustain clear seeing, and to produce discomfort when the eye was protected by an opaque eye shade with a dark lining and by an opaque eye shade with a white lining. The loss of efficiency is the result of a three hour test. The tendency to produce discomfort is estimated by the time required for just noticeable discomfort to be set up.

Lining of eye shade	Lighting system	Watts	Foot-candles			Per cent. loss of efficiency	Time limen of discomfort in seconds (not reading)	Time limen of discomfort in seconds (reading)
			Horizontal	Vertical	45°			
White	Indirect	800	5.2	1.36	3.5	9.1	85	50
	Semi-indirect ..	760	5.8	1.45	4.0	10.6	81	48
	Direct	880	4.2	1.41	2.6	12.0	75	45
Dark	Indirect	800	5.2	1.36	3.5	33.0	23	19
	Semi-indirect ..	760	5.8	1.45	4.0	33.4	19	15
	Direct	880	4.2	1.41	2.6	35.0	16	13

TABLE IV.—THE ANGLE AT WHICH THE LIGHT FALLS ON THE WORK.

Showing a comparison of the tendency to cause loss of visual efficiency or power to sustain clear seeing, and to produce discomfort of the angle at which the light falls on the work. The loss of efficiency is the result of a three hour test. The tendency to produce discomfort is estimated by the time required for just noticeable discomfort to be set up.

Reflection from reading page	Foot-candles			Per cent. loss of efficiency	Time limen of discomfort in seconds (reading)
	Horizontal	Vertical	45°		
Diffuse	5.3	1.84	3.9	6.6	95
Specular	5.3	1.84	3.9	14.3	30

STATE LEGISLATION CONCERNING WOOD ALCOHOL.

Fourth Paper.

By FRANK ALLPORT, M. D.,

Chairman Conservation of Vision Committee, American Medical Association,

CHICAGO, ILL.

Wood alcohol with its green color, disgusting odor and vile taste has been manufactured for many years. It was also known as methyl alcohol, wood spirits, methylated spirits, etc. It was used in the trades (on account of its cheapness) to dissolve shellac, etc., and as it could not be swallowed on account of its taste and smell, nor inhaled for any length of time on account of its odor, but little harm resulted from its use. About the year 1890, however, the commercial spirit of the manufacturer, led him to realize, that if the taste and smell could be eliminated, wood alcohol could be largely used as a cheap and profitable substitute for grain or ethyl alcohol. The chemist has therefore (with deadly skill) gradually evolved a more and more agreeable variety of wood alcohol, until there is now, upon the market, a form of this product, that can hardly be distinguished from grain alcohol, except by those thoroughly familiar with its appearance, smell and taste. This variety of wood alcohol goes under the names of "Columbian Spirits," "Purified Wood Alcohol," "Standard Wood Spirits," "Colonial Spirits," "Standard Wood Spirits," "Manhattan Spirits," "Cologne Spirits," "Union Spirits," "Pro Spirits," "Eagle Spirits," "Lion d' or," "Hastings Spirits," "Acetone Alcohol," "Green Wood Spirits," etc. These different names are probably used to increase the sale of this deadly poison. The public is not, even now thoroughly familiar with the fact, that whatever the title of this product may be, as indicated by the label on the bottle, and however it may be stripped of its bad taste, smell, etc., its deadly qualities remain the same. It is still wood alcohol, and it is still capable of producing blindness and death. The uncertainty of the situation is what constitutes its peril. Here is an article, that to all appearances is good alcohol, and yet is likely to produce blindness and death by drinking or inhaling it. I, myself, could not tell the difference, and certainly ignorant people could not, and yet wood alcohol, masking under the various "aliases," is advertised as "A pure refined spirit, for domestic use, and a perfect substitute for grain alcohol, for all external purposes," or some other equally

misleading form of advertisement. Thus, we have upon the market a preparation so deadly, that a teaspoonful taken into the stomach or its free inhalation into the lungs, *may* produce blindness and death, and yet this product is claimed to be a "cheap and comparatively harmless substitute for grain alcohol," and its labels are frequently misleading and injurious in their results. No one can, of course, object to the manufacture and sale of poisons, but they should be sold distinctly *as* poisons, and should be clearly labelled, and the purchaser should understand that a purchase of a poison is being made. Moreover, poisons should only be sold under authority, and such sales should be duly registered. Take the label on certain (retail) bottles of refined wood alcohol for instance; it proclaims in *large letters* that this drug is "A Pure Refined Spirit" and a "Perfect Substitute for Grain Alcohol." It also states that it is for "External Use" and in *minute type* that it "Must not be taken internally." The purchaser is not properly warned of its highly poisonous qualities, and a purchaser could easily believe that he is merely buying a good quality of cheap alcohol, and that it would be foolish to pay a higher price for grain alcohol.

In 1912, Dr. Casey A. Wood of Chicago, made some experiments in an endeavor to ascertain the true status of the retail drug trade concerning the sale of Columbian Spirits. He purchased a small quantity of this article in ten retail drug stores in Chicago. He ascertained the following facts. Four stores placed no "Caution" or "Poison" labels on the bottles. The others attached labels but did not register the names of the purchaser. In most of the stores, "Denatured" alcohol was cheaper than Columbian Spirits. There was therefore no excuse for purchasing the latter.

Some people here and abroad drink dilute alcohol as an intoxicant and it cannot, therefore, be wondered at, that many such individuals have ignorantly purchased deodorized wood alcohol in some of its numerous forms, and suffered blindness and death as a result. This can be particularly well understood when it is realized that wood alcohol (in some form) is often sold at grocery and other stores, in loose quantities, being freely poured out into any container (usually old beer bottles) brought by the purchaser, and that no label whatever is stuck to the bottle to warn the purchaser of the name, or damage of the liquid.

Wood alcohol under its various titles is also used in the trades—in varnishing pianos, furniture, etc.; making varnishes, explosives, artificial leather enamels, celluloid, liniments, Florida water, tinc-

tures, paregoric, hair dyes, formaldehyde, Jamaica ginger, compound spirits of lavender, anisette, essence of lemon, white brandy, alcoholic extracts, stiffening hats, lacquering brass, cheap whisky, tonics, proprietary remedies, photography, etc. It is also used as a fuel, in lamps and stoves. The aniline dyes contain wood alcohol, and workmen who handle these dyes in their manufacture, and in coloring feathers, flowers, etc., sometimes become blind. Wood alcohol is sometimes used with injurious results in coating lead pencils. Barbers sometimes use purified wood alcohol in diluting bay rum and witch-hazel, etc., and Turkish bath shampooers sometimes use it after the bath. Painters usually use some form of wood alcohol to thin and dissolve shellac, as it is cheaper, and because they think it cuts shellac better than "industrial alcohol." Under such circumstances it is sometimes consumed by workmen as a drink, or inhaled while at work, with blindness or death as a result. One notable method of poisoning by wood alcohol is in using it to dissolve shellac in the interior of beer vats. Shellackers go inside of a beer vat to clean it with (perhaps) wood alcohol; air is supposed to be pumped inside the vat, to provide fresh air for the workmen to breathe, but sometimes the pump does not work, and disastrous results follow. Even when the pump works properly, a workman can only endure the fumes for a short time, and then is compelled to come out and breathe fresh air for a time, before he can resume work. It must be said in justice to the brewers that many of them have recognized the danger to their workmen, and take extraordinary precautions to safeguard them; even to the extent of having their vats lined with glass, thus doing away entirely with the necessity of dissolving the shellac, with alcohol or anything else.

One of the most aggravating features of the wood alcohol controversy is the fact that although there is on the market a safe alcohol, as cheap, if not cheaper, than any disguised wood alcohol, yet the manufacture and sale of the latter continue. In 1906, Congress passed a law permitting the free manufacture and sale of what was known as Denatured or Industrial Alcohol, consisting of 90 parts of grain alcohol, 10 parts of wood alcohol and one-half of 1 part of benzine or pyridine. This preparation can be used for heating, lighting, cooking and various other industrial purposes. Owing to its freedom from taxation, etc., it is cheaper than wood alcohol, and is a safe article to handle. It has had a gradually increasing sale.

In spite of this provision for a non-poisonous industrial, grain

alcohol the manufacture and sale of deodorized wood alcohol continues, and reports of blindness and death from its use are reported from time to time, owing probably to its tardy elimination from the body, and the retention in the body of its end-product, formic acid. Such retarded elimination produces blindness by an acute neuro-retinitis followed by nerve atrophy, or death by acute stomach and bowel inflammation and cardiac depression. These conditions are doubtless largely influenced by personal idiosyncrasy. While great ignorance concerning the injurious effects of any of the forms of wood alcohol still exists, and while its unprincipled sale still continues, the results of the propaganda against this poison must be regarded with great satisfaction, for its sale has gradually been diminished, in direct proportion to the increased sale of Industrial or Denatured Alcohol, and it would seem as if the day was not far distant, when the manufacture and sale of wood alcohol would be almost entirely discontinued. This good work has been accomplished largely through the efforts of Casey Wood, G. de Schweinitz, F. Buller, W. A. Holden, Carolyn Van Blarcom, F. Park Lewis, Miss L. L. Schuyler and others, to whom the thanks of this country are due. The city of New York has been particularly active in efficient work against the wood alcohol evil. This has been largely due to the efforts of the New York Committee for the Prevention of Blindness and the Hon. E. J. Lederle, Commissioner of Health. Acting under the authority of the New York City Board of Health, many saloonkeepers and other guilty people have been successfully brought to justice, and the examples thus made have taught a salutary lesson to all concerned in selling and consuming any of the different varieties of wood alcohol. The law against the adulteration of liquors in New York State and New York City has also been of distinct benefit in the campaign against wood alcohol. It is thought by those engaged in the New York campaign that the fines usually imposed (about \$150.00) for selling wood alcohol are not sufficient to extract the profits from the sales. It is felt that if the full penalty should be imposed (\$500.00), the sales would practically cease. It is also felt that many saloonkeepers are really ignorant of the injurious effects of wood alcohol, and that even if they are cognizant of the facts, they often purchase wood alcohol ignorantly owing to the fact that the containers in which they are received, are not always duly labelled "Poison, etc.," as is required under the State Pharmacy law of New York. Massachusetts has also been particularly active in its crusade against wood alcohol, and convictions under the Food and Drug law have

not been infrequent. The law of the New York State Board of Pharmacy on the subject of labelling, in Sections 238 and 241, says: "It is unlawful for any person to sell at retail or to furnish methyl or wood alcohol, without affixing or causing to be affixed to the bottle, box, vessel or package a label with the name of the article and the word "Poison," distinctly shown, and with the name and place of business of the seller, all printed in red ink, together with the name of such poisons printed or written thereupon in plain legible characters." The law distinctly states that these rules shall apply also to the sale of this article for use in the arts.

The Massachusetts law, not only prohibits the adulteration of drugs with wood alcohol but specifies that "Whoever, himself or by his servant or agent, or as the servant or agent of any other person, sells, exchanges or delivers any wood alcohol, otherwise known as methyl alcohol, either crude or refined, or denatured alcohol, which contains any methyl alcohol under, or by whatever name or trade mark the same may be known, shall affix to the bottle or vessel, containing the same, a label bearing the words "Poison, Not for Internal Use," in red letters, of uncondensed Gothic type, not less than one-fourth of an inch in height, and the same words, "Poison, Not for Internal Use," in stenciled letters of similar Gothic type of a size not less than three-fourths, nor more than $1\frac{1}{2}$ inches in height, for use on barrels and kegs. Whoever violates any provision of this section, shall pay a fine of not less than \$50.00 nor more than \$200.00 for each sale in respect to which the violation occurs." It is surprising that the laws of New York, Massachusetts, etc., that go into so much detail should not also upon the labels, warn the public against inhaling wood alcohol, by which so many people have suffered such disastrous results.

MARYLAND.

Wood Alcohol.

1904.

Any person, firm or corporation engaged in the business of making, manufacturing, compounding or dispensing drugs, medicines, medicinal or chemical preparations for human consumption, who shall in person or by his, their or its agents or employes, make, mix, manufacture, compound, dispense, sell or deliver to any person, any drug, medicine, medicinal or chemical preparation, intended for internal use, wherein ethyl, or grain alcohol usually enters as part of, or is in anywise employed in the making, mixing or manufacture, compounding or preparation of such drug, medicine, medicinal or chemical preparation: and who shall, in the

making, mixing, manufacturing or compounding of such drug, medicine or medicinal or chemical preparation, substitute or use, in part or in whole, methyl, or wood alcohol, in place and stead of ethyl, or grain alcohol, or who shall in any manner put or introduce methyl, or wood alcohol, into such drug, medicine, medicinal or chemical preparation, shall be guilty of a misdemeanor, and, upon conviction, shall be punished by a fine of not less than one hundred dollars nor more than five hundred dollars, or by not less than three months nor more than twelve months imprisonment, or by both, in the discretion of the court.

MARYLAND.

Law enacted by the Maryland Legislature in 1904.

No person, firm or corporation engaged in making, manufacturing, compounding and selling extracts, essences or other fluids commonly used for the purpose of flavoring articles of food or drink shall use or employ, or permit to be used or employed by his, their or its agents or employes, the making, manufacture or compounding of such flavoring extracts, essences or fluids any methyl, or wood alcohol; nor shall any person, firm or corporation, his, their or its agents or employes, sell, or offer for sale at wholesale or retail, any flavoring extract, essence or other fluid commonly used for flavoring articles of food or drink when the same contains any methyl, or wood alcohol; and any person, firm or corporation, his, their or its agents, employes or officers, violating the provisions of this section shall be guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not less than one hundred dollars nor more than five hundred dollars, or by not less than three months nor more than twelve months' imprisonment, or by both, in the discretion of the court.

VIRGINIA.

Act of Legislature,
1904.

Nothing in this section shall be construed as licensing any person, firm, or corporation to sell wood alcohol, or any mixture thereof, as a beverage; and the sale of such wood alcohol, or mixture thereof, as a beverage is hereby prohibited.

VIRGINIA.

Pharmacy and Drug Act,
1908.

(a) The term "alcohol" is defined to mean common or ethyl alcohol. No other kind of alcohol is permissible in the manufac-

tuer of drugs, except as specified in the United States Pharmacopoeia or National Formulary.

WISCONSIN.
Act of Legislature,
1905.

No person, firm, or corporation shall require or wilfully permit the use of wood alcohol, or shellac or other materials dissolved in or mixed with wood alcohol, or "Columbian spirits," within any vat or tank, in such manner as to cause injury to or endanger the life or health of the person so using it, or any other person or persons.

Any person who violates any of the provisions in Section 1 of this act shall be punished by a fine of not less than \$25 nor more than \$100 for each such offense.

It shall be the duty of the Commissioner of Labor, the Factory Inspector, or any assistant factory inspector, to enforce this act.

A drug shall be deemed to be adulterated if it contains wood alcohol, except when intended for external use only and so labelled.

WISCONSIN.
Dairy and Food Commission.
1915.

"Section 4601. An article shall be deemed to be adulterated within the meaning of the preceding section: (Drugs) 1. * * * First, if, when sold, or offered or exposed for sale or had in possession with intent to sell, under or by a name recognized in the United States pharmacopoeia or national formulary, it differs from the standard of strength, quality or purity laid down in the latest edition thereof, current at the time when such drug is sold or offered or exposed for sale or had in possession with intent to sell; second, if its strength, quality or purity falls below the professed standard under which it is sold; third, if it contains wood alcohol except when intended for external use only and so labeled."

WISCONSIN.
Dairy and Food Law.
1915.

Flavoring extracts. A flavoring extract is a solution in ethyl alcohol of proper strength of the sapid and odorous principles derived from an aromatic plant, or parts of the plant, with or without its coloring matter, and conforms in name to the plant used in its preparation.

CONNECTICUT.
Drug and Food Law.
Public Acts of 1905.

Every person who shall sell any of the articles named in the schedule accompanying this section, marked schedule A, except when prescribed by a practicing physician, or sold at wholesale to licensed pharmacists, or for use in manufactures or the arts, shall label the bottle, box, or wrapper containing any such article, with a label upon which shall be plainly written or printed the word "poison," and any person violating the provisions of this section shall be fined one dollar.

Schedule A.

Acid carbolic, ammoniated mercury, acid muriatic * * *
wood or methylic alcohol under any name or in any mixture.

CONNECTICUT.
Food and Drug Act,
1907.

The term "alcohol" is defined to mean common or ethyl alcohol. No other kind of alcohol is permissible in the manufacture of food products or of drugs, except as specified in the "United States Pharmacopoeia" or "National Formulary."

CONNECTICUT.
Publication of 1913.

Be it enacted by the Senate and House of Representatives in
General Assembly convened:

Section 1. Every physician having knowledge of any person whom he believes to be suffering from poisoning from lead, phosphorus, arsenic, brass, wood alcohol, mercury, or their compounds, or from anthrax, or from compressed-air illness, or any other disease, contracted as a result of the nature of the employment of such person, shall, within forty-eight hours, mail to the commissioner of the bureau of labor statistics a report stating the name, address, and occupation of such patient, the name, address, and business of his employer, the nature of the disease, and such other information as may reasonably be required by said commissioner. The commissioner of the bureau of labor statistics shall prepare and furnish to the physicians of this state suitable blanks for the reports herein required.

Sec. 2. No report made pursuant to the provisions of this act shall be evidence of the facts therein stated in any action at law against any employer of such diseased person.

Sec. 3. Any physician who shall neglect or refuse to send any report herein required, or who shall fail to send the same within the time specified in this act, shall be liable to the state for a penalty of not more than ten dollars, recoverable by civil action in the name of the state by the commissioner of the bureau of labor statistics.

Approved, April 22, 1913.

NORTH DAKOTA.

2946: *Methyl Alcohol prohibited.* It shall be unlawful to sell, offer or expose for sale, or to have in possession any preparation or product intended for the use of man, either for internal or external purposes, including washes and perfumes, which contain methyl alcohol or wood spirits. (1907, ch. 196, 6; R. C. 1905, 2160; 1905, ch. 10, 6.)

2945: *Physicians' Prescriptions to be filled.* Nothing in this article shall be so construed as to in any way interfere with the written prescription of any regularly licensed physician or with the filling of the same by a licensed druggist. (1907, ch. 196, 7; R. C. 1905, 2161; 1905, ch. 10, 7.)

2946: *Penalty For So Doing.* Any person violating any of the provisions of this article shall be deemed guilty of a misdemeanor and shall for the first offense be punished by a fine of not less than five dollars or more than one hundred dollars, and all necessary costs, including the expense of analysing such adulterated articles when said person has been found guilty under this article, and all such adulterated or misbranded articles may by order of the court be seized and destroyed. (1907, ch. 196, 8; R. C. 1905, 2162; 1905, ch. 10, 8.)

2947: *Duty of State's Attorney.* It shall be the duty of the attorney-general and state's attorney to prosecute all persons violating any of the provisions of this article when the evidence thereof has been presented by the North Dakota government agricultural experiment station as provided for in sections 2949 and 2950. (1907, ch. 196, 9; R. C. 1905, 2163; 1905, ch. 10, 9.)

MINNESOTA.

Act of Legislature.

1905.

Any person violating the provisions of this act shall be deemed guilty of a misdemeanor and be punished by a fine of not less than \$50 and not more than \$100 for each and every offense, or by imprisonment in the county jail for not less than thirty days or more than ninety days.

No person shall make, brew, distil, sell or serve, in any form, any adulterated, spirituous, fermented or distilled liquor, and any such liquor shall be deemed adulterated if it contains any of the following named substancesmethyl alcohol, or derivatives therefrom.

Every person who, with intent that the same may be sold as unadulterated or undiluted, shall adulterate or dilute, wine, milk, distilled spirits, malt liquors, or any drug, medicine, food or drink for man or beast; or shall offer for sale or sell the same as unadulterated or undiluted, or without disclosing to or informing the purchaser that the same has been adulterated or diluted; or shall manufacture, sell, expose, or offer for sale, such article of food, or drink, any substance in imitation thereof, without disclosing the imitation by a suitable and plainly visible mark or brand; or with intent that the same may be used as food, drink, or medicine, shall sell, offer or expose for sale, any article whatsoever which to his knowledge has become spoiled, tainted or for any cause unfit to be used as food, drink, or medicine, where special provision has not otherwise been made by statute for its punishment, shall be guilty of a misdemeanor, and punished by a fine of not less than twenty-five dollars or by imprisonment in the county jail for not less than thirty days.

MINNESOTA.

Act of Legislature.

1913.

"No person, by himself, his servant or agent, or as the servant or agent of another person or persons, shall sell, exchange, deliver or have in his custody or possession with intent to sell, exchange or deliver, or expose or offer for sale, exchange or delivery, any wood alcohol, or substance commonly known as wood alcohol, unless each package, bottle, cask, can or receptacle containing the said wood alcohol shall be plainly marked, stamped, branded or labeled on the outside and face of each said package, bottle, cask, can or receptacle of the capacity of less than one gallon, in legible type not smaller than large primer, and on the outside and face of each package, bottle, cask, can or receptacle of the capacity of one gallon or more, in legible letters of not less than one inch in length, the letters and words "wood naphtha," "poison."

CALIFORNIA.
State Board of Health.
1905.

Regulation 27. The term "alcohol" is defined to mean common or ethyl alcohol. No other kind of alcohol is permissible in the manufacture of drugs, except as specified in the United States Pharmacopoeia or National Formulary.

San Francisco Law.
1906.

It shall be unlawful to sell, offer for sale, deliver or cause to be delivered any drug or medicine labelled with the recommendation that the same is for the internal or external use of man which contains methyl alcohol.

ALABAMA.
Criminal Law.
1907.

It shall be unlawful to sell, offer, or expose for sale, or otherwise dispose of or have in possession, any preparation or product intended for the use of man, either for internal or external purposes, which contains methyl alcohol or wood spirits.

KANSAS.
Law of State Board of Health.
1907.

(a) The term "alcohol" is defined to mean common or ethyl alcohol. No other kind of alcohol is permissible in the manufacture of drugs, except as specified in the United States Pharmacopoeia or National Formulary.

KANSAS.
State Board of Health.
1914.

1. Flavoring extract. Extract, Flavoring, Flavor, is a solution in ethyl alcohol of proper strength of the sapid and odorous principles derived from an aromatic plant, or parts of the plant, with or without its coloring matter, and without added coloring matter, and conforms in name to the plant used in its preparation. Substances sold for flavoring under names used in the U. S. Pharmacopoeia or National Formulary conform to the requirements of those authorities in respect to strength and quality.

MONTANA.

Act of Legislature.

1907.

Section 1636. *Sale of Poisons Regulated.* It shall be unlawful for any person from and after the passage of this Act to retail any of the following named poisons, to-wit: Arsenic, and its preparations, corrosive sublimate, white and red precipitate, bini-odide of mercury, cyanide of potassium, hydro-cyanic acid, strychnine, and all poisonous vegetable alkaloids and their salts, the essential oil of almonds; opium and its preparations, except paregoric and other preparations of opium containing less than two grains to the ounce; aconite, belladonna, colchicum, conium, nox-vomica, digitalis, and their pharmaceutical preparations; croton oil, chloroform, chloral hydrate, sulphate of zinc, mineral acids, carbolic acid, oxalic acid, wood alcohol, without labeling the box, bottle, vessel, paper or package in which said poison is contained, with the article, and the word "poison," and the name of the place of business of the seller. Also each label of such poison shall contain a concise statement of the principal antidotes for the poison so labelled. The label hereby required to be placed upon wood alcohol shall contain the following: "Warning" "The fumes of wood alcohol burned in a close room, if inhaled are injurious to eyesight, often producing total blindness." Nor shall it be lawful for any person to deliver or sell any poisons enumerated above, unless upon due inquiry it be found that the purchaser is aware of its poisonous character, and represents that it be used for a legitimate purpose. The provisions of this Section shall not apply to the dispensing of poisons in not unusual quantities or dose upon the prescription of practitioners of medicine. Any person or persons violating the provisions of this Section shall be deemed guilty of a misdemeanor; Provided, however, that this Section shall not apply to manufacturers, making and selling at wholesale any of the above poisons, and provided that each bottle, box, vessel, paper, or package in which said poison is contained shall be labelled with the name of the article, the word "poison" and the name and place of business of the seller.

MAINE.

Act of Legislature.

1907.

Section 21. Whoever, himself or by his servant or agent, or as the servant or agent of any other person, sells, exchanges or delivers any wood alcohol, otherwise known as methyl alcohol, shall

affix to the vessel containing the same and shall deliver therewith a label bearing the words "Wood Alcohol, Poison" in red letters of not less than one-fourth inch in height. Whoever violates the provisions of this section shall pay a fine of not less than fifty dollars and not more than two hundred dollars.

Section 22. Whoever, himself or by his servant or agent, or as the servant or agent of any other person, sells, exchanges or delivers, or has in his possession with intent to sell, exchange or deliver, any article of food or drink, or any drug intended for internal use, containing any wood alcohol, otherwise known as methyl alcohol, shall be punished by a fine of not less than two hundred dollars or by imprisonment for not more than thirty days, or by both fine and imprisonment.

NORTH CAROLINA.
Food and Drug Law.
1908.

Manufacturing and selling spirituous liquor to be used as a beverage containing poisonous properties is a misdemeanor punishable by not less than 5 years and a fine, at the discretion of the court.

An article of food shall be deemed to be adulterated, if it contains any added poisonous or other added deleterious ingredients which may render such article injurious to health. If it contains any of the following substances which are hereby declared deleterious and dangerous to health when added to human food, to-wit: wood alcohol.

COLORADO.
Food and Drug Act.
1908.

The use of the "very poisonous" methyl alcohol (wood alcohol, Colonial or Columbian Spirit), is prohibited in all preparations for internal or external use, as regards the human body. This prohibition includes extracts, beverages, washes, perfumes, cosmetics, etc.

SOUTH CAROLINA.
Act of Legislature.
1909.

Section 1. An Act—Making lawful the manufacture within the State of ethyl and methyl alcohol from sawdust, slabs, or any other wood substance.

Section 2. No alcohol manufactured under the provisions of

this act shall ever be used either within or without this State as a beverage or for medicinal purposes.

Section 10. Nothing in the act prohibiting the sale of alcoholic liquors shall prevent the sale of wood or denatured alcohol.

NEW YORK.

State Law.

1909.

Article 8, Agricultural Law 201, 1909.—200. No person, firm, association or corporation shall within this State manufacture, produce, sell, offer or expose for sale any article of food which is misbranded within the meaning of this article.

201. Definition of adulterated or misbranded food: An article of food shall be deemed to be adulterated if it contains methyl or wood alcohol, in any of its forms, or any methylated preparation made from it.

An article shall be deemed to be adulterated in the case of spirituous, fermented and malt liquors, if it contain methyl or wood alcohol in any of its forms,

New York City Law,

1912.

No person or corporation shall have, sell or offer for sale any food or drink which contains methyl alcohol (commonly known as wood alcohol) or any preparation or mixture of any kind whatsoever containing the same, intended either for internal or external use by man; nor shall methyl or wood alcohol or any preparation or mixture containing the same be used upon or applied to the person or body of another.

Board of Health of New York City.

1915.

Sec. 92. It shall be the duty of the manager or managers, superintendent, or person in charge of every hospital, institution, or dispensary, in the City of New York, to report to the Department of Health, in writing, the full name, age, and address of every occupant or inmate thereof or person treated therein, affected with any one of the occupational diseases included in the list appended, with the name of the disease, within twenty-four hours after the time when the case is diagnosed and it shall be the duty of every physician to make a similar report to the said Department within the said period relative to any person found by such physician to be affected with any one of the said occupational diseases, stating, in each instance, the name of the disease: Arsenic poisoning, bisulphide of carbon poisoning, brass poisoning, caisson

disease (compressed-air illness), carbon monoxide poisoning, dinitrobenzine poisoning, lead poisoning, mercury poisoning, methyl alcohol or wood naphtha poisoning, natural gas poisoning, phosphorus poisoning.

Sec. 124. No person shall sell, offer for sale, give away, deal in, or supply, or have in his or her possession with intent to sell, offer for sale, give away, deal in, or supply, any article of food or drink or any medicinal or toilet preparation, intended for human use internally or externally, which contains any wood naphtha, otherwise known as wood alcohol or methyl alcohol, either crude or refined, whatever may be the name or trade mark under or by which the said wood naphtha shall be called or known.

No person shall sell, offer for sale, give away, deal in, or supply, or have in his or her possession with intent to sell, offer for sale, give away, deal in, or supply, any wood naphtha, otherwise known as wood alcohol, or methyl alcohol, either crude or refined, whatever may be the name or trade mark under or by which the said wood naphtha shall be called or known, unless the container in which the same is sold, offered for sale, given away, dealt in, or supplied, shall bear a notice containing the following advice and words conspicuously printed or stenciled thereon, viz.:

(Skull and crossbones represented.)

POISON.

WOOD NAPHTHA OR WOOD ALCOHOL.

WARNING.—It is unlawful to use this fluid in any article or food, beverage, or medicinal or toilet preparation, intended for internal or external human use.

NEW YORK.

State Pharmacy Law.

1915.

§237. *Adulterating, Misbranding and Substituting.* A drug is adulterated in any of the following cases: If it contains methyl or wood alcohol when intended for use as a medicine except when sold as a veterinary liniment for external use only and so labeled.

OKLAHOMA.

Food and Drug Law.

1909.

The term "alcohol" is defined to mean common or ethyl alcohol. No other kind of alcohol is permissible in the manufacture of drugs, except as specified in the "United States Pharmacopœia" or in the "National Formulary."

PENNSYLVANIA.

Food and Drug Law.

1909.

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Any drug containing methyl alcohol (wood alcohol) will be regarded as adulterated within the meaning of this act (Adopted 1910).

An article of food shall be deemed to be adulterated, if it contains any added ingredients deleterious to health.

PENNSYLVANIA.

Dairy and Food Act.

Publication of 1914.

RULE NO. 12, FLAVORING EXTRACTS. The names flavoring extract, flavor, flavoring, essence and tincture, as applied to articles intended for use in the preparation of foods, shall be used only to designate solutions in ethyl alcohol of proper strength of the sapid and odorous principles derived from an aromatic plant, or parts of the plant, with or without its coloring matter, and shall conform in specific name to the plant used in its preparation.

Flavoring solutions, in the preparation of which flavoring substances not derived from the plant specifically named have been added, shall not be designated as if prepared solely from the aromatic plant named.

An imitation flavoring extract shall not be given a name nor bear upon its label any statement, design or device that shall in any way indicate that it is the flavoring extract which it imitates.

PENNSYLVANIA.

Publication of 1915.

RULES AND REGULATIONS ADOPTED BY THE ADVISORY BOARD OF THE DEPARTMENT OF HEALTH AT HARRISBURG ON THE FOURTEENTH DAY OF JANUARY, 1915.*

Every physician practicing in any portion of this Commonwealth, who shall treat or examine any person suffering from, or afflicted with, paratyphoid fever, anthracosis, arsenic poisoning, brass poisoning, carbon monoxide poisoning, lead poisoning, mercury poisoning, natural gas poisoning, phosphorus poisoning, wood alcohol poisoning, naphtha poisoning, bisulphide of carbon poison-

*Any person who violates any order or regulation of the Department of Health, or who resists or interferes with any officer or agent thereof in the performance of his duties in accordance with the regulations and orders of the Department of Health, shall be deemed guilty of a misdemeanor, and shall upon conviction thereof, be punished by a fine of not more than one hundred dollars, or by imprisonment not exceeding one month, or both, at the discretion of the court. Section 16 of the act of April 27, 1905.

ing, dinitrobenzene poisoning, caisson disease (compressed-air illness), shall if said case shall be located in a township of the first class, a borough, or a city, forthwith make a report in writing to the health authorities of said township, city, or borough; and, if said case shall be located in a township of the second class, or a city, borough, or township of the first class not having a board of health or body acting as such, to the State Department of Health.

KENTUCKY.

Act of Legislature.

1910.

The term "alcohol" is defined to mean ethyl alcohol, of the degree of refinement required in the Pharmacopoeia. No other kind of alcohol is permissible in the manufacture of drugs, except as specified in Regulation 9.

It has been found by the inspector that the dealers have been using what is known as commercial alcohol in the manufacture of drugs. Commercial alcohol does not meet the requirements of the Pharmacopoeia for freedom from aldehyde and fusel oil, and under the law cannot be used. The dealer should insist that the wholesaler or jobber supply him with the United States Pharmacopoeia alcohol. (Bulletin No. 144.)

WASHINGTON, D. C.

Food and Drug Law.

1910.

(a) The term "alcohol" is defined to mean common or ethyl alcohol. No other kind of alcohol is permissible in the manufacture of drugs except as specified in the United States Pharmacopoeia or National Formulary.

WASHINGTON, D. C.

Food and Drug Law.

1906.

That for the purpose of this Act an article shall be deemed to be misbranded: In case of drugs—if the contents of the package as originally put up shall have been removed, in whole or in part, and other contents shall have been placed in such package, or if the package fail to bear a statement on the label of the quantity or proportion of any alcohol, morphine, opium, cocaine, heroin, alpha or beta eucane, chloroform, cannabis indica, chloral hydrate, or acetanilide, or any derivative or preparation of any such substances contained therein.

OHIO.

Act of Legislature.

1910.

Chap. 1, Sec. 5777.—A drug is adulterated within the meaning of this chapter (6) if it contains any methyl or wood alcohol.

Section 5778.—Food, drink, confectionery, or condiments are adulterated within the meaning of this chapter (11) if they contain any methyl or wood alcohol.

Section 5779.—A flavoring extract is adulterated within the meaning of this chapter (8) if it contains any methyl or wood alcohol.

OHIO.

Publication of 1915.

Act of State Board of Health—Endorsed by the State Legislature.

Adopted by the State Board of Health under Authority granted in Sections 4227, 1239, 1237. General Code of Ohio. See pages 4, 5, 6 and 7.

SECTION 1. The following named diseases and disabilities are hereby made notifiable and the occurrence of cases shall be reported as herein provided.

GROUP 2. OCCUPATIONAL DISEASES AND INJURIES.

Arsenic poisoning. Brass poisoning. Carbon monoxide poisoning. Lead poisoning. Mercury poisoning. Natural gas poisoning. Phosphorus poisoning. Wood alcohol poisoning. Naphtha poisoning. Bisulphide of carbon poisoning. Dinitrobenzene poisoning. Caisson disease (compressed-air illness). Anilin poisoning. Turpentine poisoning. Benzol (Benzine) poisoning. Any other disease or disability contracted as a result of the nature of the person's employment.

OHIO.

Dairy and Food Commission,

1914.

Department Ruling No. 8.

Alcohol.

Alcohol is a drug recognized by the laws of Ohio as a product with two definite standards. When sold as alcohol without any qualifying statement it must be construed to be alcohol containing 94.9% absolute alcohol. When sold as a diluted alcohol it must contain by virtue of the same authority 48.9% of absolute alcohol.

The laws of Ohio have adopted the United States Pharmacopoeia as a standard under sections 5777 and by such adoption have fixed the standard of these drugs at the above strength. Therefore, the

sale of alcohol by or under its official name, but with a percentage of absolute alcohol that varies from that standard, shall be labeled to show in addition to the word alcohol, the percentage of absolute alcohol.

The recognition of alcohol as a drug in the United States Pharmacopoea, under section 5777 would absolutely prohibit its sale under that name if any variation was made from the standard. But, this department recognizing the fact that alcohol of other strengths are in daily use and in constant demand, will require that after this date the sale of all alcohol that varies from the U. S. P. standard shall be labeled and bear a statement upon the label of the percentage of absolute alcohol.

This regulation brings this section in its application to alcohol to conform practically to section 7 of the Federal Food and Drugs Act, which section reads, in part, as follows:

“ that no drug defined in the U. S. P. or N. F. shall be deemed to be adulterated under this provision if the standard of strength, quality or purity be plainly stated upon the bottle, box or other container thereof, although the standard may differ from that determined by the test laid down in the U. S. P. or N. F.”

Sales of alcohol made without compliance with the above regulation will be deemed by this department to be violation of clause 1, section 5777, and subject the person making such sale to prosecution under the above section.

ILLINOIS.

Act of Legislature.

1911.

No person shall, within this State, by himself, his agent, or servant, or as a servant or agent of any other person or corporation, manufacture, brew, distil, have or offer for sale, or sell any spirituous or fermented or malt liquor, containing any drug, substance, or ingredient not healthful or not normally existing in said spirituous, fermented or malt liquor, or which may be deleterious or detrimental to health when liquors are used as a beverage, and the following drugs, substances, or ingredients shall be deemed to be not healthful and shall be deemed to be deleterious or detrimental to health when contained in such liquors, to-wit: methyl alcohol and its derivatives.

Whoever adulterates, for the purpose of sale, any liquor used or intended for drink with substances which are poisonous or injurious to health; and whoever sells or offers or keeps for sale any such liquor so adulterated, shall be confined in

the county jail not exceeding one year, or fined not exceeding one thousand dollars, or both.

No person shall mix any article of food, drink or medicine, or any article which enters into the composition of food, drink or medicine, with any other ingredient or material, whether injurious to health or not, for the purpose of gain or profit, or sell, or offer the same for sale, or order, or permit any other person to sell or offer for sale any article so mixed, unless the same be so manufactured, used or sold or offered for sale under its true and appropriate name, and notice that the same is mixed or impure is marked, printed or stamped upon each package, roll, parcel or vessel containing the same, so as to be and remain at all times readily visible, or unless the person purchasing the same is fully informed by the seller of the true name and ingredient (if other than such as are known by the common name thereof) of such article of food, drink or medicine, at the time of making sale thereof or offering to sell the same.

GEORGIA.

Food and Drug Act.

1911.

Nothing in the preceding sections of this article shall prohibit the sale, by licensed druggists, of wood or denatured alcohol for art, scientific or mechanical purposes.

The term alcohol is defined to mean ethyl alcohol, of the degree of refinement in the "U. S. Pharmacopoeia."

FLORIDA.

Food and Drug Act.

1911.

An article of food shall be deemed to be misbranded. if (it) fail to bear a statement on the label in conspicuous letters of the quantity or proportion of any alcohol

A drug or food product is misbranded in case it fails to bear a statement on the label in conspicuous letters of the quantity or proportion of any alcohol.

The term "alcohol" is defined to mean common or ethyl alcohol. No other kind of alcohol is permissible in the manufacture of drugs or foods except as specified in the "United States Pharmacopoeia" or "National Formulary."

NEW HAMPSHIRE.

Act of Legislature.

1911.

Section 1. Whoever, by himself, or by his servant, or agent, or as the servant or agent of another person, sells, exchanges or delivers any wood alcohol, otherwise known as methyl alcohol, either crude or refined, or denatured alcohol which contains methyl alcohol, under whatever name or trade mark the same may be called or known, shall affix to the bottle or vessel containing same, a label bearing the words "Poison, not for internal use" in stenciled letters of a similar Gothic type of a size not less than three-quarters of an inch nor more than one and one-half inches in height for use on barrels and kegs. Whoever violates any provision of this section shall pay a fine of not less than \$50 nor more than \$200 for each sale in respect to which the violation occurs.

Section 2. Whoever, himself, etc., sells, etc., any article of food or drink or any drug intended for internal use, containing any wood alcohol (methyl alcohol), either crude or refined, under whatever name or trade mark the same may be called or known, shall be punished by a fine of not less than \$200, or by imprisonment for not more than thirty days, or by both such fine and imprisonment.

NEW HAMPSHIRE.

State Board of Health Law.

Publication of 1915.

Section 1. *Report of Occupational Diseases.* Every physician in this state attending on or called in to visit a patient whom he believes to be suffering from poisoning from lead, phosphorus, arsenic, brass, wood-alcohol, mercury or their compounds, or from anthrax, or from compressed-air illness, or any other ailment or disease, contracted as a result of the nature of the patient's employment, shall within 48 hours send to the state board of health a report stating:

- (a) Name, address and occupation of patient.
- (b) Name, address and business of employer.
- (c) Nature of disease.

(d) Such other information as may be reasonably required by the state board of health. The reports herein required shall be on or in conformity with the standard schedule blanks hereinafter provided for. The posting of the report, within the time required, in a stamped envelope addressed to the office of the state board of health, shall be a compliance with this section.

Sec. 2. *Blanks for Reports.* The state board of health shall prepare and furnish, free of cost, to the physicians included in section 1, standard schedule blanks for the reports required under this act. The form and contents of such blanks shall be determined by the state board of health.

Sec. 3. *Reports Not Evidence.* Reports made under this act shall not be evidence of the facts therein stated in any action arising out of the disease therein reported.

Sec. 4. *Penalty.* Any physician who neglects or refuses to send the report or reports as herein required shall be liable to the state for a penalty of five dollars for each offense, recoverable by civil action by the state board of health.

Sec. 5. *Transmission of Reports.* It shall furthermore be the duty of the state board of health to transmit a copy of all such reports of occupational disease to the commissioner of labor.

NEW HAMPSHIRE.

Publication of 1915.

This has been adopted by the food and drug laws, and is endorsed by the State Board of Health.

An Act relating to the labeling of wood alcohol.

Be it enacted by the Senate and House of Representatives in General Court convened:

Section 1. No person shall sell, offer for sale, deal in, or supply, or have in his possession with intent to sell, offer for sale, give away, deal in, or supply, any article of food or drink, or any medicinal or toilet preparation or perfume intended for human use internally or externally, which contains any wood naphtha, otherwise known as wood alcohol, or methyl alcohol, either crude or refined, under or by whatever name or trademark the same may be called or known.

Sec. 2. No person shall sell, offer for sale, give away, deal in, or supply any wood naphtha, otherwise known as wood alcohol or methyl alcohol, either crude or refined, under or by whatever name or trademark the same may be called or known, unless the container in which the same is sold, offered for sale, given away, dealt in, or supplied, shall bear a notice containing the following conspicuously printed or stenciled thereon, viz.:

POISON
WOOD NAPHTHA
or WOOD ALCOHOL

WARNING.—It is unlawful to use this fluid in any article of food, beverage, or medicinal or toilet preparation, for human use internally or externally.

Sec. 3. No person shall sell or offer for sale any alcohol which has been denatured by the addition of wood or methyl alcohol, unless the container in which the same is sold or offered for sale shall be conspicuously labeled in red with the words:

Poison. Denatured Alcohol.

Sec. 4. Whoever violates any provision of this act shall be punished by a fine not exceeding two hundred dollars, or by imprisonment not exceeding thirty days, or both such fine and imprisonment. Chapter 16, Laws of 1911, entitled "An act relating to the labeling of wood alcohol," is hereby repealed.

Approved Feb. 17, 1915.

IDAHO.
The Food and Drug Act.
1913.

Section 1398. It shall be unlawful for any person to sell at retail or to furnish any of the poisons of schedules A and B, set out in this section, without affixing or causing to be affixed to the bottle, box, vessel or package, a label with the name of the article and the word poison distinctly shown and with the name and place of business of the seller, all printed in red ink, together with the name of such poisons printed or written thereupon in plain, legible characters.

Wholesale or retail druggists shall not delivery any of the poisons of schedules A and B until he has satisfied himself that the purchaser is aware of its poisonous character and that the poison is to be used for a legitimate purpose. The provisions of this paragraph do not apply to the dispensing of medicines or poisons on physicians' prescriptions.

Schedule B. Nicotine, colchium, conium, hellabore, henbane, phytolacca, strophanthus, arsenical solutions, methyl or wood alcohol, mineral acids, oxalic acid, paris green, salts of lead, salts of zinc, or any drug, chemical or preparation which, according to the Pharmacopocia and Formulary and Homeopathic Pharmacopocias is destructive to adult human life in quantities of 60 grains or less.

Whoever shall sell or deliver to any person any poisonous substance specified in Section 1398, without labeling the same and recording the delivery thereof in the manner prescribed in said Section 1398, shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be fined not less than Ten Dollars nor more than One Hundred Dollars.

IDAHO.

Food and Drug Law.

1913.

Section 1135. *Adulterated Spirituous and Malt Liquors.* No person shall within this State, by himself, his servant or as agent of any other person or corporation, manufacture, brew, distill, have or offer for sale, or sell any spirituous or fermented or malt liquors containing any drug, substance or ingredient not a normal constituent in spirituous, fermented or malt liquors, or which may be deleterious or detrimental to health when such liquors are used as a beverage, and the following drugs, substances or ingredients shall be deemed to be not normal in spirituous, fermented or malt liquors, and shall be deemed to be deleterious or detrimental to health when contained in such liquors, to-wit: *Cocculus indicus*, chloride of sodium, copperas, opium, cayenne pepper, picric acid, Indian hemp, strychnine, arsenic, tobacco, darnel seed, extract of logwood, salts of zinc, copper or lead, alum, methyl alcohol and its derivatives, amyl alcohol, and any extract or compound of any of the above drugs, substances or ingredients.

NEVADA.

Food and Drug Law.

1913.

The term "alcohol" is defined to mean common or ethyl alcohol. No other kind of alcohol is permissible in the manufacture of drugs except as specified in the United States Pharmacopoeia or National Formulary.

RHODE ISLAND.

Act of Legislature.

1915.

SECTION 1. Sections 1 and 2 of Chapter 834 of the Public Laws, passed at the January session, A. D. 1912, entitled "An Act in relation to the sale of wood alcohol," are hereby amended so as to read as follows:

"Section 1. Any person who sells, exchanges or delivers to another person any wood alcohol, sometimes known as methyl alcohol, shall affix to the vessel or container holding the same a label bear-

ing the words, "Wood alcohol poison," printed or written thereon in letters not less than one-fourth of an inch in height, and in addition thereto the words "it is unlawful to use this fluid in any article of food or drink, or in any medicinal or toilet preparation, intended to be used internally or externally," printed or written thereon in letters not less than one-eighth of an inch in height. Any person violating the provisions of this section shall be fined not less than fifty dollars, nor more than five hundred dollars.

"Sec. 2. Any person who sells, exchanges or delivers or has in his possession with intent to sell, exchange or deliver, any article of food or drink, or any drug, intended for external or internal use, or perfumes or toilet articles, containing any wood alcohol, sometimes known as methyl alcohol, shall be punished by a fine of not less than fifty dollars, nor more than five hundred dollars, or by imprisonment for not more than six months, or by both such fine and imprisonment."

SEC. 2. It shall be the duty of the board of food and drug commissioners to prosecute any person, firm or corporation violating the provisions of this chapter and any member of said board may make complaint for the violation of the provisions of this chapter, and such commissioner making such complaint shall not be required to give surety for the payment of costs.

SEC. 3. This act shall take effect upon its passage, and all acts and parts of acts inconsistent herewith are hereby repealed.

IOWA.

State Board of Pharmacy.

Publication of 1915.

Sec. 4999-a36. Drugs or preparations containing wood or denatured alcohol—sale prohibited.—No person, firm or corporation shall sell, offer, or expose for sale, or have in his possession, any preparation or product intended for use of man or domestic animal, either for internal or external use, or for cosmetic purposes, or for inhalation, or for perfumes, which contain methyl (wood) alcohol, crude or refined, or denatured alcohol.

LOUISIANA.

Food and Drug Regulations. No 32 (a) :

1915.

"The term 'alcohol' is defined to mean grain or ethyl alcohol. No other kind of alcohol is permissible in the manufacture of drugs, foods, liquors or waters, except as specified in the United States Pharmacopoeia or National Formulary."

SOUTH DAKOTA.

Food and Drug Law Endorsed by State Legislature.

1915.

III. THE USE AND LABELING OF WOOD ALCOHOL.

This law, which is Senate Bill No. 131, prohibits the use of methyl alcohol, commonly known as wood alcohol, in any article of food or drink or any medicinal or toilet preparation for internal or external use of man, and prescribes a certain form of label for containers of wood alcohol. It is as follows:

Be it enacted by the Legislature of the State of South Dakota:

1. That it shall be unlawful for any person, firm or corporation by himself, herself, itself, or themselves, or by his, her, its or their agents, servants or employees to sell, offer for sale, expose for sale, deal in or supply, or have in possession with intent to sell, offer for sale, deal in or supply or give away any article of food or drink or any medicinal or toilet preparation, intended for human use internally or externally which contains any wood alcohol, or methyl alcohol, either crude or refined, under or by whatever name or trade mark the same may be called, or known.

2. It shall be unlawful for any person, firm or corporation by himself, herself, itself, or themselves, or by his, her, its, or their agents, servants or employees, to sell, offer for sale, expose for sale, deal in or supply or have in possession with intent to sell, offer for sale, give away, deal in or supply any wood alcohol or methyl alcohol, either crude or refined, under or by whatever name or trade mark it may be called or known unless the container in which it is sold, offered for sale, exposed for sale, given away, dealt in or supplied shall bear a notice containing the following device and words conspicuously printed or stenciled thereon:

(Skull and Crossbones)

POISON

WOOD ALCOHOL

WARNING: It is unlawful to use this fluid in any article of food, beverage, medicinal or toilet preparation for human use internally or externally.

3. The State Food and Drug Commissioner shall be charged with the enforcement of this act.

4. The State's Attorney of each county of this State is hereby authorized upon complaint on oath of the Food and Drug Commissioner to prosecute before any Court of competent jurisdiction in the name of the State of South Dakota, a proper action or proceed-

ing against any person or persons violating the provisions of this Act.

5. Any person, firm or corporation, who, by himself, themselves or his or their agents, servants or employees, violates any of the provisions of Sections 1, 2 and 3 of this Act shall be guilty of a misdemeanor and upon conviction thereof shall be punished by a fine of not less than fifty (\$50.00) dollars nor more than two hundred (\$200.00) dollars, or by imprisonment in the county jail not more than three months.

6. All Acts and parts of Acts in conflict with this Act are hereby repealed.

Approved March 6th, 1915.

IV. THE SALE OF POISONS BY OTHER THAN REGISTERED PHARMACISTS.

This law, Senate Bill No. 85, permits the sale of poisons by general stores under certain restrictions, one of which is that the stock of poison must be kept separate and apart from the place in which food products are kept for sale in the store. This is the only portion of the law with which the Food and Drug Department is concerned. From the wording of the first section of the law stores which deal only in groceries are not permitted to handle poisons, but those having one or more other departments than food-handling departments may sell the poisons which are enumerated. We construe this law to mean, therefore, that the poisons must be kept in a room or part of the room entirely separate from the place where foods are kept, and inspectors of the Department will see that the law is enforced in this respect. The law follows:

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF SOUTH DAKOTA:

1. In any town in this state where there is no registered pharmacist, and there is a merchant handling exclusively goods other than goods used for food, or a merchant who handles goods used for food and who also handles goods other than those used for food in a separate department from that in which goods are handled and sold for food purposes, it shall be competent for any such merchant to sell the poisonous drugs known as Paris Green, Peroxide of Hydrogen, Formaldehyde, Wood Alcohol, Rat Poison, Gopher Poison and Insect Powder, provided, however, that this section shall not apply to the sale of strychnine, arsenic, corrosive sublimate or carbolic acid.

2. Such drugs above enumerated, if sold by any such merchant as above provided shall be sold only in original packages, excepting peroxide of hydrogen, be kept separate and apart from any place in which food products are kept for sale within such store, and each package shall be labeled and marked in plain and distinct letters, "Poison" and with the figures of the "skull and crossbones" stamped thereon.

3. Any such merchant selling any such poisonous drugs shall keep a register, and when he sells any of the same, he shall record in his register the name of the purchaser, date of sale, kind of drug sold, amount of same and for what purpose bought, which register shall be open at all times for inspection.

4. No merchant shall have the authority to sell any such poisonous drugs as in the preceding sections provided, until he or they shall have first procured a certificate of authority so to do from the state board of pharmacy. Any such merchant may make written application to such board and upon receipt of such application accompanied by a fee of one dollar, it shall be the duty of such state board of pharmacy to issue a certificate of authority which certificate shall be valid for a period of one year from date of its issuance, and may be renewed upon the application of any such merchant and the payment of the fee prescribed herein.

5. Any person who knowingly violates any of the provisions of this Act shall be guilty of a misdemeanor and upon conviction shall be punished by a fine of not less than ten dollars or more than fifty dollars.

Approved March 5th, 1915.

NEW JERSEY.

Publication of 1915.

An act to prohibit the distribution and sale and to regulate the use of foods, drugs and certain other mixtures and preparations, intended for use by man or animal, containing methyl or wood alcohol.

1. No person shall sell, or offer or expose for sale, or have in his possession with intent to distribute or sell any food, drug, preparation or mixture of any kind whatsoever, intended for internal use, which contains methyl or wood alcohol; nor shall any person sell, or offer or expose for sale, or have in his possession with intent to distribute or sell, or use upon or apply to the body of another, any drug, hair tonic, bay rum or similar preparation, intended for external use, which contains methyl or wood alcohol, *provided, however,* that nothing in this section shall apply to veterinary

remedies containing methyl or wood alcohol when such remedies are plainly and distinctly labeled in such a manner as to indicate that they are intended solely for external use on animals.

2. Any person who shall violate any of the provisions of this act shall be liable to a penalty of one hundred dollars for the first offense, and to a penalty of two hundred dollars for the second offense, and to a penalty of three hundred dollars for the third and each subsequent offenses.

6. This act shall take effect immediately.

MASSACHUSETTS.

Publication of 1915.

Wood Alcohol must be labeled "Poison."

SECTION 1. Whoever, himself, or by his servant or agent, as the servant or agent of any other person sells, exchanges or delivers any wood alcohol, otherwise known as methyl alcohol, either crude or refined, or denatured alcohol which contains any methyl alcohol, under or by whatever name or trade mark the same may be called or known shall affix to the bottle or vessel containing the same a label bearing the words "Poison. Not for Internal Use," in red letters of uncondensed Gothic type not less than one-fourth of an inch in height, and the same words, "Poison, Not for Internal Use," in stenciled letters or similar Gothic type of a size not less than three-fourths nor more than one and one-half inches in height for use on barrels and kegs. Whoever violates any provision of this section shall pay a fine of not less than fifty nor more than two hundred dollars for each sale in respect to which the violation occurs.

SECTION 2. Whoever, himself, or by his servant or agent, or as the servant or agent of any other person sells, exchanges or delivers, or has in his possession with intent to sell, exchange or deliver, any article of food or drink, or any drug intended for internal use, containing any wood alcohol, otherwise known as methyl alcohol, either crude or refined, under or by whatever name or trade mark the same may be called or known, shall be punished by a fine of not less than two hundred dollars, or by imprisonment for not more than thirty days, or by both such fine and imprisonment.

FEDERAL LAW.

1906.

Section 1. From January 1, 1907, domestic alcohol may be withdrawn from bond without the payment of internal revenue tax, for the use in the arts and industries, and for fuel, light, and power, provided said alcohol shall have been mixed, in the presence

of a Government officer, after withdrawal from the distillery warehouse, with methyl alcohol, or other denaturing material or materials, which will destroy its character as a beverage and render it unfit for liquid medicinal preparations. (Regulations as to the denaturation are given.)

Section 60. Any one using denatured alcohol for the manufacture of any beverage or liquid medicinal preparation, or who knowingly sells any beverage or liquid medicinal preparation, made in whole or in part from such alcohol, becomes subject to the penalties prescribed in Sections 2 of the Act of June 7, 1906.

COMMENTS.

I desire to say, anticipatory of criticisms concerning this series of papers on Ophthalmic Laws, that the data upon which these articles have been founded, have been obtained with great difficulty. Each paper has cost me on an average between 500 and 600 letters, owing to many causes, unnecessary to mention. I can only say that I have done the best I could to secure accurate and reliable information, and if errors have crept in, it has not been my fault. If any mistakes have been made, I would be greatly obliged if some one in possession of the facts would so inform me, and corrections can be made in a supplementary paper at the end of the series. I also wish to say that I have not given space to laws of a thoroughly indefinite character. Take, for instance, the present paper on Wood Alcohol, some states have certain laws rendering it illegal for any one to adulterate foods and drugs, with anything that is injurious to the public. This law might, of course, be assumed to refer to Wood Alcohol, or anything else that is injurious, but I have not deemed such laws sufficiently explicit to warrant their mention in this paper.

It will be observed that 31 states have a law of *some* kind bearing upon Wood Alcohol. Some of these laws emanate from the legislatures, others from the state board of health, others from the pure food and drug commission, others from the dairy and food commission, others from the state board of pharmacy, etc., while, in some states, the law is a joint affair proceeding from two or more of these official organizations. These facts can be ascertained by a perusal of the different state laws enumerated in this paper.

The first law to be passed in the United States, on Wood Alcohol, was by the Maryland legislature in 1904. This was followed, in 1905, by the legislatures of Wisconsin, Minnesota and North Dakota, and by the food and drug commission of Connecticut in the same year. The United States passed a federal law concerning

Wood Alcohol in 1906. The first city to pass a Wood Alcohol law was San Francisco in 1906. New York City passed a law in 1912, and these are the only cities I know of that possess specific laws concerning Wood Alcohol, although there may be others, as I have made no particular inquiries concerning city legislation, as these papers refer only to *state* legislation. In some states the law does not mention Wood Alcohol at all, but the reference to Wood Alcohol is so obvious that the meaning of the law is unmistakable. This is true in Virginia, California, Louisiana, Kansas, District of Columbia, Connecticut, Florida, Oklahoma and Nevada, where the law declares that Alcohol means *Ethyl* Alcohol, and that *no other kind of Alcohol* is permissible in manufacturing drugs, except as specified in the United States Pharmacopoeia, or in the National Formulary. Wood Alcohol poisoning is a reportable condition in Ohio, Connecticut, Pennsylvania, New Hampshire and New York City. In Connecticut, it must be reported by the Doctor in charge within 48 hours, or a fine of \$10.00 will be imposed. In Pennsylvania, the Doctor must report or be subject to a fine of not more than \$100.00 or imprisonment of not more than one month, or both. In New Hampshire, the Doctor must report within 48 hours or be fined \$5.00. In New York City, Doctors, hospitals, institutions, dispensaries, etc., must report in 24 hours. In Ohio, drugs, drinks, confectionery, condiments and flavoring extracts are considered adulterated if they contain Wood Alcohol. In Wisconsin, the law holds *any* drug or article to be adulterated if it contains Wood Alcohol, except when intended for external use, and then it must be so labeled—and the law distinctly states that flavoring extracts must be made up with ethyl alcohol. Kansas also insists upon the use of ethyl alcohol in manufacturing flavoring extracts, Pennsylvania declares that all flavoring extracts, essences, tinctures, drugs, etc., are adulterated, if they contain wood alcohol. In Minnesota, liquors, drugs, food and drinks are considered adulterated if they contain any form of wood alcohol, and anyone who manufactures the same, or sells them, or even has them in his possession as a business, shall be fined from \$50.00 to \$100.00 or be imprisoned for from 30 to 90 days. Anyone in this state who fails to truthfully label such adulterated articles and who neglects to explain to a purchaser the dangers of wood alcohol, shall be subject to fine or imprisonment. In Massachusetts, all people dealing in drugs, drinks or foods adulterated with wood alcohol, are liable to fine and imprisonment. In Maryland, all extracts, essences, foods, drugs, etc., must not be adulterated with

wood alcohol, and must not be sold, or a fine or imprisonment may be imposed.

In Idaho, the law prohibits the adulteration of liquors. (They seem to be particular about their liquor out there). In New Hampshire, the adulteration or selling of all kinds of food, drinks, drugs, toilet articles, or perfumes, with wood alcohol either for internal or external use is prohibited, under penalty. In New Jersey, no food, drug, mixture, hair tonic, bay rum, etc., shall be kept or sold, containing wood alcohol, without being subject to a fine. In North Dakota, no one shall sell or keep any article either for internal or external use, if it contains wood alcohol. A fine may be imposed for disobedience. In New York City, foods, drugs, drinks, toilet articles, etc., for human use, either internally or externally, must not be adulterated with wood alcohol. No one must use such preparations on the body of another. In New York State, all drugs, foods, liquors, etc., are considered adulterated, if they contain any form of wood alcohol. Such articles must not be kept or sold. Veterinary liniments containing wood alcohol may be kept and sold if properly labeled. In South Dakota, foods, drinks, drugs, etc., for human use, either internally or externally must not be adulterated with wood alcohol. Such articles must not be sold or kept. The same is essentially true in Rhode Island, New Hampshire and South Dakota. A fine is liable for disobedience. In Kentucky, only ethyl alcohol is allowed in the preparation of drugs. In Illinois, no drug, liquor, food, or drink shall be adulterated with any kind of wood alcohol, or sold if so adulterated, under penalty. All articles containing wood alcohol must be so labeled, and purchasers must be informed of its poisonous qualities. In Georgia, whenever alcohol is mentioned in chemical processes, ethyl alcohol is meant. In Colorado, no preparation for humans either for internal or external use, must be adulterated with wood alcohol. The same law exists in Alabama. In South Carolina, no drug or drink shall be adulterated with wood alcohol. In North Carolina, food is considered adulterated if it contains wood alcohol. In Iowa, cosmetics and perfumes must not be adulterated with wood alcohol. In San Francisco, it is illegal to sell or keep drugs, for man, containing wood alcohol. In Rhode Island, no one shall sell or keep any food, drink, drug, toilet article, etc., adulterated with wood alcohol under penalty. The same is true in Maine. Druggists may dispense wood alcohol in a doctor's prescription in Connecticut, Idaho, North Dakota and Montana. In Montana and Iowa, purchasers of wood alcohol must be warned of its danger when in-

haled. The sale of any form of wood alcohol, for either internal or external use, on man or beast, is prohibited in Iowa. In the following states wood alcohol in its various forms may be sold, by wholesale or retail druggists, but, it must always be properly labeled, and the customer must be aware of its poisonous character: Connecticut, Rhode Island, Maine, Minnesota, Massachusetts, Idaho, New Hampshire, New York City, Montana, and South Dakota.

In Virginia, it is illegal to make or sell wood alcohol as a beverage. This is also true in North Carolina. In New Jersey, properly labeled wood alcohol may be sold for veterinary purposes. In Georgia, it is specifically stated in the law, that wood alcohol may be sold for use in the arts, sciences and medicines. In Montana, manufacturers of wood alcohol may sell their product freely provided it is properly labeled, "Poison," together with the name and address of the seller. In South Dakota, provisions are made for the sale of wood alcohol by merchants in towns where there are no registered pharmacists, by stipulating that it is to be sold in original packages, and properly labeled. Records must be kept of the name of the purchaser, the date of the sale, the amount sold, and the purpose for which it is to be used. In Wisconsin, it is illegal to use any kind of wood alcohol inside of a beer vat or tank, in such a manner as to endanger the life or health of workmen. (They evidently feel that Wisconsin's chief industry must be protected.) The United States law relieves "Domestic" alcohol from taxation, to be used in the arts and industries, and for use as fuel, light and power, provided the mixing of the two alcohols which destroys its character as a beverage is done in the presence of a government official. The law forbids the use of denatured alcohol in beverages or drugs.

Any one reading the various laws regulating the sale of the various forms of wood alcohol must be impressed with their general laxity, and the ease with which the laws can be evaded. How easy it would be, for instance, for a purchaser to buy some form of purified or deodorized wood alcohol, on the pretext of using it as a liniment for a horse, or as a polish for silver. Laws of this kind are so easily broken that there might almost as well be no law at all, and in many states there are no laws whatever on this subject. The facts in the case are as follows: There are three kinds of wood alcohol on the market.

1st. The raw, unpurified, foul smelling, and foul tasting wood alcohol.

2nd. Denatured, industrial, or domestic alcohol made of about 90 parts of ethyl alcohol, 10 parts of wood alcohol and some benzine or pyridine.

3rd. The various forms of so-called deodorized or "purified" wood alcohol, which is still wood alcohol, but, with its bad taste, smell and color removed.

Unpurified wood alcohol is so disgusting to smell, and so nauseous to taste that there is little or no temptation to drink or inhale it, and there can be no reasonable objection to its free manufacture and sale to the trades, arts, sciences, etc., either by wholesale or retail. Denatured alcohol is free from taxation, and therefore cheap, and has been rendered disgusting to taste and smell by the addition of wood alcohol, benzine or pyridine. There can therefore be no reasonable objection to its free manufacture and sale. But with deodorized or "Purified" wood alcohol, or Columbian Spirits, or Eagle Spirits, or any of the other numerous names under which deodorized or "Purified" wood alcohol masquerades, the case is different. Here is an article, cheap, and looking, tasting and smelling like ethyl alcohol. This similarity in appearance, etc., is what makes it salable and dangerous. In my judgment it should not even be manufactured, for denatured alcohol is as cheap, if not cheaper, and is probably just as useful. But, if some form of deodorized "Purified" wood alcohol is necessary for a certain few manufacturing purposes, etc., it should be sold for such purposes only, and should never be placed on the retail counters. It should pass directly from its maker to the manufacturer, and any transgression of this programme, should be strictly punished by law.

7 W. Madison St., Chicago, Ill.

SWIMMERS' CONJUNCTIVITIS.

DR. HARRY S. GRADLE,

CHICAGO.

Read before the Chicago Medical Society, Dec. 1, 1915.

In 1899, Schultz¹ reported a series of conjunctival infections that apparently had their source in a swimming pool. He believed it to be a form of trachoma, which was disputed by Fehr² a few months later. On the basis of continued treatment, the latter regarded his cases as a "clinically characteristic, contagious conjunctivitis, very similar in its initial appearance to trachoma, but radically different when judged from the clinical course." This disease was not mentioned again for thirteen years until Hunt-müller & Paderstein³ reported a series of fourteen cases. Judged from the standpoints of history and geography, it was unlikely that these were true trachomas, but rather an endemic infection of the conjunctiva acquired in several of the swimming pools of Berlin. All of the affected individuals were young adults and in the majority, the disease was unilateral. Three years later, four of the cases were found to have thickened lids (although without conjunctival changes), similar to the trachomatous complication and slight vascularization of the cornea. Cell inclusion bodies microscopically identical with the Prowaczek-Halberstädter Chlamydozoa, were found in conjunctival scrapings from the fresh cases and could be transmitted to apes. From their investigations, these authors concluded that they were dealing with an infectious disease of the conjunctiva, but could not decide whether it was a disease *sui generis* or a low grade trachoma.

Brown⁴ reported five hundred cases that had appeared in Philadelphia during the summer of 1914. The source of infection was traced to various baths in a restricted area. The disease assumed more of the character of a "pink-eye" rather than a trachoma and was of short duration, the average length of time under treatment being three days. The period of incubation was assumed to be twelve hours, because all of the cases became bilateral within that length of time. In one case there appeared a corneal ulcer (probably due to secondary infection), the only complication among the entire five hundred. The bacteriological findings in the few cases

1. P. Schultz, *Berl. Klin. Woch.* 1899, No. 39.

2. O. Fehr, *Berl. Klin. Woch.* 1900, No. 1.

3. Huntmüller & Paderstein, *Dent. Med. Woch.* 1913, Jan.

4. S. H. Brown, *Med. Record*, 1914, Aug. 8.

thus examined were so varied as to be entirely without value, nor was any mention made of search for the inclusion bodies. Evidently, this epidemic reported by Brown was of an entirely different character than the one that occurred in Berlin and was probably an acute epidemic infection wherein the etiological factor was not recognized.

During the summers of 1914-5, I saw 18 cases of acute infection that I was forced to classify under the heading of swimmers' conjunctivitis. The majority of these occurred in young adults and a large percentage gave a direct history of the disease appearing within 3 days after swimming in a confined pool. The majority had used a large church center natatorium; several, a smaller pool, located in the slums; and two, Y. M. C. A. pools in cities other than Chicago. Four (4) of the total number had been in Lake Michigan but not in any indoor swimming tanks.

Smears from all of the cases were examined with methylene blue and gram stains for the bacteria, usually found in infected conjunctival sacs. In a few, there were found staphylococci, Xerosis and Morax-Axenfeld organisms, but nothing that could give rise to the clinical picture present. Almost half of the cases were examined by scraping the conjunctiva and staining the smear with Giemsa; where silver nitrate had not been used, the cell inclusion bodies were always found; but even infrequent use of silver caused a rapid disappearance of these bodies.

Clinically, the picture was about as follows:

In the earlier stages of the disease, occasionally unilateral but frequently bilateral within a week.

Moderate photophobia.

Small amount of muco-purulent secretion, particularly at night.

Moderate oedema of the lids.

Tarsal conjunctiva slightly swollen and roughened. Coarse injection with individual vessels standing out prominently. No distinct hyperplasia of follicles. These symptoms increasing as the transitional folds are approached.

Conjunctiva of the transitional folds more swollen, with a smoother surface and deeper red color. Injected vessels lose their individuality. On eversion, the conjunctiva presents the rugae-like appearance characteristic of the rectal mucosa.

Bulbar conjunctiva slightly oedematous and swollen. Moderate coarse injection beginning at the transitional folds and decreasing toward the cornea, so that the limbus is surrounded by a zone of

normal appearing conjunctiva. Caruncle participates only slightly in the conjunctival infection.

Cornea normal.

Under treatment, the disease loses its severity in less than a week and assumes a more subacute form. The discharge lessens and the conjunctiva becomes pale. As the treatment is continued, first, the bulbar conjunctiva becomes normal, followed within a short time by a resumption of the normal appearance of the tarsal conjunctiva. The disease is apt to remain in the transitional folds for some time after this has occurred and unless treatment be continued, will frequently undergo an acute exacerbation. Under ordinary conditions, the life of the disease is about three weeks.

The best treatment that I have been able to find (and I have tried everything I could think of) was 1% silver nitrate, daily, and argyrol 10%, three times a day, or more. The silver nitrate seemed most effective when dropped directly into the conjunctival sac; for forcible closure of the lids, spread the caustic into the depths of the transitional folds, the parts most affected. These were not reached by simply brushing the fluid onto the everted lids.

In no case was there an involvement of the cornea or irritation of the deeper structures of the eye. Several times, treatment was stopped too soon and a subacute exacerbation occurred. But these usually yielded to continued treatment. In one case, the disease persisted—a chronic form—for over six months. The patient was a young girl of a neurotic temperament and in a physically poor condition. Two per cent. Ichthyol and massage finally overcame the trouble, although this treatment was without avail in several other cases.

These cases would seem to coincide with the three reports from Berlin and form, I believe, a definite clinical entity. In its acute stage, the disease unquestionably resembles a fresh sub-acute trachoma; but the clinical course soon differentiates the two. Corneal complications did not occur in this series of cases and if we consider the inclusion bodies as probable etiological factors, never will occur. These bodies seem to be constant during the early stages of the disease but disappear rapidly upon treatment. Whether or not they are to be regarded as positive etiological factors, time alone can tell.

THE VALUE OF ACCURATE LOCALIZATION OF STEEL IN THE EYE AND ORBIT.

DR. C. C. CLEMENT,

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In diagnosing the case of an eye suspected of containing a foreign body, it is certainly essential to determine if possible, whether the foreign body is within or without the scleral wall. There are many cases in which this question can be settled only by radiographic localization and until this point is determined the treatment of the case cannot be given intelligent consideration. This fact would seem to be so self-evident as to be indebatable, yet there are probably very few ophthalmologists of any considerable experience who have not seen attempts made to remove from the globe a piece of steel that was later found to be beyond its borders, or the much more disastrous mistake made of leaving the steel in the globe on the assumption that it was safely buried in the orbital fat.

I have recently seen a case in which a comparatively large piece of steel had passed entirely through the globe and stopped just outside of the posterior scleral wall. The giant magnet applied to this eye might have drawn the steel back into the vitreous from which it had escaped and transformed the simple operation of removing it through a conjunctival incision, into the dangerous one of drawing it back through the vitreous.

There are doubtless many other possibilities of doing damage through ignorance of the location of the fragment which do not present themselves just now. Such possible complications cannot be foretold or anticipated and it is certainly unscientific to refuse to take advantage of all possible information merely on the assumption that we might be able to get along without it.

This paper is limited to the consideration of the value of the accurate localization of *magnetic* steel. This limitation is made because the great advantage to be gained by accurate localization of all foreign bodies within the globe which are *nonmagnetic*, which cannot be drawn out by magnetic attraction, but which must be cut down upon and removed by means of traction instruments, if removed at all, is so great as to admit of no argument. In these desperate cases localization is practically a necessity and no one would have the temerity to advocate blindly fishing for an object whose position was unknown, if it were possible by any means to localize it.

When we use the term accurate in connection with localization

we thereby imply *radiographic* localization, for the radiograph, employed in connection with the scheme of localization elaborated by Sweet and others (or one similar to it), is now recognized as the only method of localization which is at all accurate. Results obtained by any other method would not be considered accurate localizations. Even when the foreign body can be seen by means of the ophthalmoscope its position cannot be as accurately determined as by radiographic localization. The use of the magnet for this purpose is fraught with great danger and is justifiable only in those cases where expert radiography is not available. It does not localize the foreign body in the position which it originally occupied but shows the point to which the magnet has drawn it, perhaps after doing irreparable damage. In many cases it is a total failure.

The value of accurate localization in one sense depends upon its availability and its reliability. It is available as a rule only in medical centers, for it is work requiring elaborate and expensive equipment, whose operation requires special training. To attempt to locate the foreign body without this equipment and training is the purest guess work, no matter how skillful the radiographer may be in other fields. Its reliability when properly performed, is limited only by the slight degree in which the eye examined may differ from the normal or average eye upon which the chart is based. There is no question about the accuracy of the method; it is only a question of the ability of the radiographer.

It is seldom that one has an opportunity to check up on a localization and determine whether or not it was correct. I have recently had a very gratifying experience in proving the accuracy of this work in two cases. In one case the piece of steel was localized just outside of the sclera when the clinical evidence pointed to its being just inside. Subsequent operation confirmed the localization. In the other case a previous localization by a different radiographer had localized the steel just outside of the sclera and the second localization placed it just inside. Subsequent operation proved the accuracy of the work of the radiographer. The steel was found exactly where he said it was.

If it has been determined beyond all question of doubt that the foreign body is inside of the globe, the next consideration must be the choice of operation for its attempted removal.

Since the position of the foreign body is one of the most important factors in determining the choice of operation, a knowledge of this position would seem to be of the greatest importance, if

not an absolute necessity. However, the fact remains that the majority of steel extractions are in all probability attempted without the aid of localization.

It is considered beyond the province of this paper to discuss the choice of operations chosen for the removal of steel from the vitreous. Both the scleral and corneal routes seem to have their field of usefulness and both have advocates who advance valid arguments in support of their claimed advantages. It is safe to assume that both forms of operation will continue to be performed. The literature seems to indicate that extraction by the scleral route is growing in popularity. Such a tendency is what would naturally be expected with the increased practice of accurately localizing the foreign body before operation. If it was ever justifiable to remove the steel from the vitreous by scleral incision, when in comparative ignorance of its position, and if results justified a continuance of this practice, the operation would naturally be expected to grow in popularity as accurate localization comes into more general use and correspondingly better results are obtained.

If extraction through a corneal incision is selected a knowledge of the exact location of the steel makes possible a modification of the classical Haab operation which lessens the danger of injury to the lens and does away with unnecessary traversing of the vitreous. Instead of placing the tip of the magnet over the center of the cornea and drawing the fragment to the posterior surface of the lens and then leading it around through the zonula, the tip is placed in a position on the cornea as near as possible to the foreign body and so located that it will draw it directly through the circumferential space without injury to the lens. It is then drawn into the anterior chamber as in the original Haab operation.

Unquestionably the most valuable use of accurate localization is in connection with the extraction of steel through an incision in the sclera. In these cases it reduces the amount of traumatism to a minimum and in a corresponding degree reduces the subsequent reaction and degeneration, which opponents of this operation argue are apt to follow its performance.

An operation in which accurately located steel is cut down upon and removed through a small wound, and without inserting any instrument into the vitreous, is not to be classed with those operations in which the tip of the magnet is inserted through a comparatively large opening and plunged into the vitreous and moved about in the hope that it will come close enough to the piece of steel (whose location is unknown), to attract and draw it out. If

the statistics of these cases could be divided into two classes—those in which localization was used and those in which it was not used, we might be able to get some idea of the value of scleral extraction when properly performed. It certainly should never be attempted without first getting as accurate a localization as possible. Reports of a series of cases published by W. K. Rogers speak eloquently in favor of accurate localization. He says, “detachment of the retina, extensive hemorrhage or traumatic disorganization of the vitreous occurred in all but two of the older cases. In these two cases the fragment had been accurately located against the wall of the globe and was directly cut down upon with the operative incision.”

If the surgeon demands of the radiographer that he shall localize the steel with great accuracy, it would seem that he in turn should, at the time of operation, be able to relocate upon the globe the exact spot beneath which the radiographer has indicated the steel lies. However, there seems to be no generally accepted method by which this is done. In fact exact relocation does not seem to be attempted as a rule, the surgeon being satisfied to make his incision somewhere in the general neighborhood in which the steel is located. Some operators make no effort to make their incision directly over the piece of steel. To quote one author. “When the steel is located by the x-ray an opening in the lower outer quadrant should be made and the larger tip of the magnet applied to the incision. If necessary the tip should be pushed toward the point indicated by the x-ray chart. It may in rare cases be necessary to push the tip entirely through the vitreous until it comes in contact with the fragment of iron.”

Although this procedure would seem to be diametrically opposite to the generally accepted rule of disturbing the vitreous as little as possible, it seems to be followed by many surgeons. They argue that the scleral incision should be made only in the free spaces between the muscles and choose the area between the inferior and external rectus as the place of election. It seems more rational to make the incision directly over the fragment unless it be in the ciliary body. There seems to be no good reason why the muscles should be avoided if the steel is beneath them. In my own limited experience approaching the sclera through the muscles has seemed to offer some advantages over the other locations. In these cases, the muscle fibres were simply split and retracted by means of sutures passing beneath them. These sutures also served as a convenient method of fixing the globe.

There is of course no way of determining what percentage of ophthalmic surgeons attempt to accurately locate their incision at the point upon the globe which corresponds to the spot indicated on the chart as the point nearest the foreign body, but it may be safely assumed that it is not universally done, as one seldom sees described the method by which it is accomplished. An instrument devised by Dr. H. P. Wells and modified by the author has served this purpose most admirably.

The medico-legal value of accurate localization is not to be ignored. I have recently seen two cases in which the exact location of the piece of steel was the point at issue and both were settled by localization.

To recapitulate:

Radiographic localization is the only accurate method of localization which we now possess.

It is dependable when performed by competent men.

It furnishes valuable information in determining whether or not the steel is within the globe.

If within the globe; it gives information which we must possess before we can make an intelligent choice of operations for its removal.

In case the corneal route is chosen it modifies the Haab operation in such a way as to lessen the probability of doing violence to the lens.

If the scleral route is chosen it usually eliminates the necessity of introducing the tip of the magnet into the vitreous, an act which should always be avoided, if possible.

From a medico-legal standpoint, it furnishes a positive record of great value.

15 East Washington St.

A CASE OF CONTUSIO BULBI.

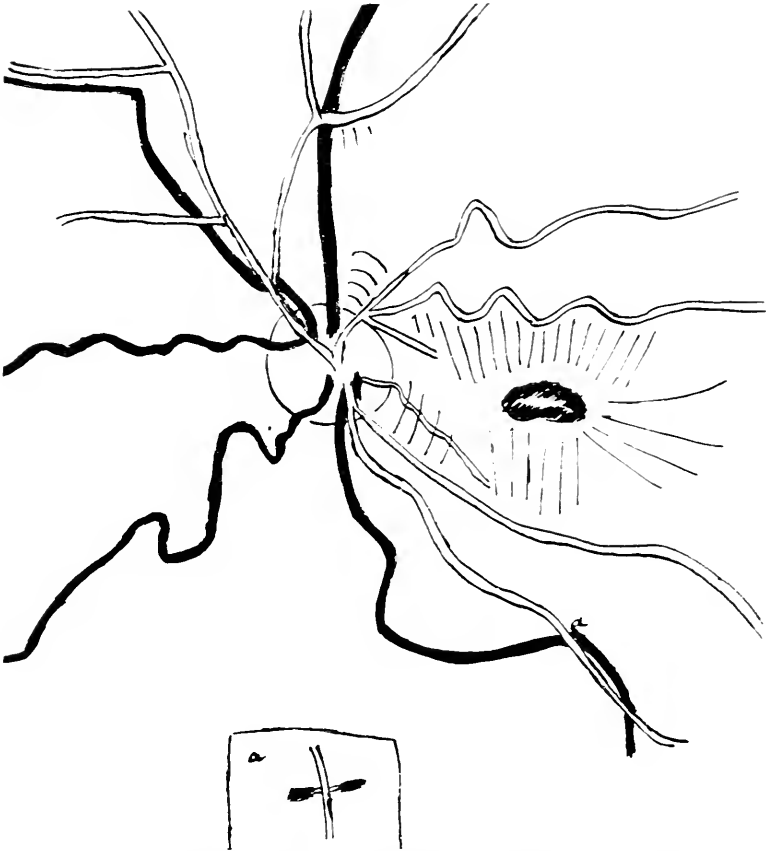
DR. E. E. BLAAUW,

BUFFALO, N. Y.

The following case is reported on account of the rare fundus picture, the like of which I have been unable to find in literature. A healthy looking Italian, about 20 years old, came to the clinic Feb. 15th. The Sunday evening before he had hurt his eye against a door; that night he could not sleep. The following day he used compresses of rose water.

A hemorrhage was found under the lower lid, chemosis with injection of vessels, photophobia and pain. Pain was still present two days later, when pressure was made on the upper-outer part of the orbit, and even Feb. 18th I find in the notes, that slight pain was felt on pressure of the bulb. The pupil at this first visit was slightly enlarged and oval, with its longer diameter from inward and downward to up and out. A question arises if this direction has something to do with the place where the greatest force was exerted on the bulb, namely perpendicular to this diameter in the temporal lower quadrant, as became apparent in the course of the observation. The pupil dilates slowly, but becomes in the end regular and round with atropine. The vitreous is hazy, cloudy, obstructs the view to the retina, especially down and inward. The vision is only counting of fingers near the eye, but this increases rapidly and on Feb. 18th, without correction, is already 5/12. At that date the general impression of the fundus is, that all vessels appear much more distinct than normally, they are more injected; the arteries and veins both are broadened, the veins at least double the size of the arteries, give the impression of dark bands. At different spots not far from the disc the veins show distinct interruptions through the overlying arteries, entirely different to when the vein crosses over the artery, then the artery disappears from sight but there is not the least change in caliber.

The disc is not sharply limited by a scleral ring at the nasal side, but the transition into the retina is more gradual with a faint idea of streaks, and a few fine lines (injected vessels) are visible. Above the papilla, between the diverging temporal and nasal vessels, about eight concentric fine intimations of pigment as streaks and a rare small spot, which is lighter tinted than the surrounding are seen. This same idea of pigmentation, but then in straight lines from up-downward is less extensively seen at the



Sketch demonstrating the five distinct seemingly interruptions of the veins and the streaky impression of the macular region—with the understanding that the black lines are in reality rather light and the spaces between them the normal red with a very fine gray-black tint as if sprinkled with very fine dust.

place where the V. temp. sup. crosses the A. temp. sup. at the second branching.

The most interesting is a fanlike mass of lines in the macular region, directly below the A. macul. sup., concentric to the fovea centr. The horizontal extension measures about four disc-diameters. Are these fine intimations of black lines with intermittent lighter lines the expression of edema retinae?

The tension in these first days of observation was slightly lower than the normal, which was demonstrated beautifully Feb. 17th. After removal of the bandage the posterior surface of the cornea looked like ising- or milk glass, or rather a multitude of lines were visible, which coursed chiefly from above downward, perhaps with a slight tendency of a concentric disposition. I consider these

lines the expression of a folding of the Descemet's membrane. On the morning of Feb. 18th these lines have disappeared. As stated before, pressure on the bulb today is still slightly painful. Bandage had been discontinued. No distinct difference in tension. Color sense cannot be determined on account of patient's ignorance of English.

Feb. 19th: Below, forward toward the temple vitreous opacity with a red-dark coloring of the retina: hemorrhage within the retina and extravasation in the vitreous, only now for the first time distinctly visible. The veins are in general broader, their central reflex less clear and both the lines, which include the reflex centrally, somewhat darker (color of dark red wine), the arteries are more light-red. The relation of the size of veins to arteries is distinctly more normal 3:2, the disc is still streaky; the same set of lines in the macular region is also visible in the lower portion, but less distinct as above. The venous interruptions are still as distinct. The difference between veins and arteries on the disc is less pronounced than normal V.: 5/12.

Feb. 21th: The central spot in the macula less clearly visible.

Feb. 23d: V. O. S.: 5/5 f. The vitreous opacities below, forward and toward the temple have a reddish hue. In one place an idea of white is suggested. The disc remains indistinctly limited.

Feb. 24th: V. O. S. 5/5-5/4. In the lower temporal part the white spot has become more distinct, is not sharply limited by a field colored much darker than the normal retina: hemorrhage in the retina, which is connected with the vitreous hemorrhage. Today all painful feeling has disappeared. Pat. starts to work tomorrow.

March 12th: Pat. seen for the last time. The broadness of the veins is reduced; everywhere the connecting parts are visible. The lines in the macular region still distinct.

Recapitulating we have to do with a very serious trauma. It seems that as a direct result of the bump against the doorknob (?) the lower temporal quadrant has had some vessel burst with a consecutive hemorrhage in the retina and vitreous. As a more indirect result we see an enormous distension of the vessels, especially of the veins, due to paralysis of the walls. The physical signs of this paralysis: distension, dark reflex, impressionability, when the arteries cross the veins (as pronounced as in any case of arteriosclerosis I have seen), remained visible during the entire time patient was under observation.

The most interesting picture of the fanlike streaks in the macula remained also as long. I cannot explain this appearance other-

wise, than by the hypothesis of folding of the membrana limitans interna or hyaloidea. The pleatings make the impression of bands, generally finely pigmented, some 1, 5 mm. broad, alternating with lines 0, 5 mm. broad, which reflect much stronger (in the upright image. The refraction was under atrop. H.: 1. D.).

The only reference to a somewhat similar condition, which I could find in the literature at my disposal, is a paper by Percy Fridenberg.¹ He gives some pictures and describes these changes as appearing to be "in the most superficial nerve-fiber layers of the retina, and consist of fine hair-like white striations, of equal caliber throughout, running perfectly evenly and parallel in the usual course through the retina of the structural elements derived from the optic nerve. The striations are extremely fine; so much, in fact, that at times they are seen with some difficulty." * * * "The white striae, while approximately parallel at the point of origin, show a radial course when large numbers are taken into the field of observation and compared." The author's interpretation does not seem to me permissible, that we have to deal with sclerosed nerve fibers, "a change in the axis cylinder, or, perhaps with greater probability, between the nerve fibers. This change is one which results in oedema with an increased refraction index, and, later, in a *sclerosis* of the originally transparent nerve fibers, or in their actual opacification." The author is so much under the spell of his supposition, that he also writes: "The resulting picture is one suggesting opaque nerve fibers in that the striae have the glistening white tendinous or asbestos-like appearance, etc.," a suggestion, which does appear to me unjustifiable. And I cannot subscribe to the statement: "We have here a number of single and extremely thin striae, very close together, it is true, but separated by equal intervals of apparently normal red retina, so that the latter appear outlined in white." It is just the different appearance of the fundus between the white striae, which is so striking. The space between two fine white lines has its undertone from the red retina, but seems additionally to be strewn with the finest of black pigmented dust. And this condition makes it at the same time so stable, that it cannot be regarded as a reflex, shifting with the incidence of the light.

Fridenberg returned the following year to the same subject with a paper on fibrillar edema of the retina after contusion.² The ophthalmoscopic picture is entirely different from the foregoing ones, still has great similarity with the one described. The chief difference is the central hemorrhage in Fr.'s case, which has reduced so markedly the vision. The author states: "Diese Hy-

pothese scheint mir die einfachste und wahrscheinlichste zu sein, und erklärt auch ungezwungen die Beschränkung des fibrillären Oedems auf den paracentralen Abschnitt der Netzhaut im Einklang mit der grösseren Vulnerabilität der vielen, feinen Gefässästchen in dieser Gegend. Man konnte vermuthen, es handle sich beim fibrillären Netzhaut ödem um eine Imbibition der einzelnen Nervenfasern, um eine Durchtränkung des Netzhautparenchyms mit seröser Flüssigkeit, deren Herkunft aus den durch Shock gelähmten Capillaren der Netzhaut und der Chorioidea nicht weit zu suchen wäre."

A more qualified than I. W. Lohmann³ writes about this the following in v. Graefe's Archiv: "Wenn man Fridenberg's Abbildungen besieht, so wird man eher die Anschauung gewinnen, dass diese Trübungen viel mehr mit den Retinalgefässen in Zusammenhang stehen. Denn die Anordnung der Sehnervenfasern ist eine solche, dass sie von der Papille nach oben und unten elliptisch zur Macula hinziehen: es kann keine Faser horizontal von der Macula zur Peripherie ziehen. Hingegen ist eine radiäre Anordnung der sich ja dichotomisch teilenden Gefässe zur Macula anatomisch gegeben, und durch die Beziehung zu ihnen werden diese zarten strichförmigen Trübungen viel ungezwungener erklärt." And herewith we take leave of the hypothesis of sclerosed nerve fibers: questioning, if the German translation is "gequellte Nervenfasern."

A. Wagenmann⁴, referring to Fridenberg's findings, states: "Die Annahme, dass sie sklerosierte Nervenfasern darstellen, erscheint unwahrscheinlich. Ich würde eher an Faltungen der Retina und Exsudat zwischen Netzhaut und Aderhaut denken." But such important changes of the membrane of vision are hardly compatible with a vision 20/20 as in the second of Fridenberg's cases.

A picture similar to the one represented by Fridenberg in his second paper had been published in 1891 by Chas. A. Oliver in the January number on the *Annals of Ophth.*⁵ The copy was made "50 hours after the accident: intraocular tension in each eye was normal. Vision in the injured eye was reduced to 5/25. (Nine months later vision has risen to full acuity the same as that with the fellow eye, and accommodative power is normal.) There was a dense subhyaloid hemorrhage. . . . In the macular region there was a stellate and irregularly shaped area, enclosing the fovea centralis at its lower inner part. This area was similar to that which at times is seen in cases where there have been slight though rapidly-given contusions of the eyeball by blunt instruments. No other gross change in the eyeground could be de-

terminated. In seven days time the vision has risen to 5 15." This stellate condition of the macular region seems to have been transient, anyhow the author states that with the exception of changes around the ruptured vein: "with the exception of these almost indiscernible sequelae, the eye is as perfect as its normal fellow."

When we see that a membrane like that of Descemet can wrinkle under a pressure bandage it seems not irrational to suppose that the membranes which divide the retina from the vitreous can undergo some folding. J. v. Benedek⁴ has shown with his histological findings of so-called pre-retinal hemorrhages, that a division should be made between the inner lining of the retina: the *membrana limitans interna* and the "*Grenzschicht*" of the vitreous; that these organs are separable in the natural way without the interference of diseased changes, as *praeretinal* hæmorrhages—before and after the *limitans*—occur in otherwise healthy eyes. The independency of this *membrana hyaloidea* "*Grenzschicht*" is also shown in its retraction from the retina in cases of high Myopia and cases with pathological retraction of the vitreous followed by condensation. The difficulty remains in differentiating between a possible folding of the *membr. hyaloidea* and the *membr. lim. int.* *in vivo*. Not only has the microscope demonstrated that the *lim. int.* can be lifted off and folded from the underlying nerve fibers and Müllers' basalplates (J. v. Benedek a. o.) but it may be clinically observed. v. Benedek saw f. i. the following condition in a case of a large *praeretinal* hæmorrhage: "*ihre Oberfläche zeigte schöne bandartige, vielfach geknickte und gebogene Reflexstreifen; sie sahen den Reflexen eines zerknitterten Stanniolpapiers nicht unähnlich.*"

I have had the good fortune to see in a patient of my friend Dr. J. Finerty a transient lifting up of the *membr. lim. int.* The pat. was seriously hurt by an accident while working; a supposition of penetration of a foreign body was present. With dilated pupil, some day, the upper part of the retina seemed so much swollen, that the vessels showed it by the curve in their course and a sharp line was present, which showed its extreme brilliancy especially if one examined in the way Haab⁵ recommends. One got the expression of something substantial hanging there—as if a sac was present.

This picture of folding of the membrane or pleating is not extremely rare as one would suppose from the literature. I remember to have seen in Dr. Hazewinkel's clinic in the fall of 1914 (the Hague, Holland) a patient with a traumatism of O. S. where

we were struck one day by these same regular bands over a distance of some 2 to 3 disc diameters stretched toward the lower part temporal from the disc, the predominating white lines running perpendicular, up down, thereby crossing at about right angles the nerve fibers.

1. Percy Fridenberg, M. D. Sclerosed nerve fibers following retinal traumatism; a hitherto undescribed ophthalmoscopic picture. Reprinted from the N. Y. Eye and Ear Infirmary Reports, Jan., 1904.
2. Percy Fridenberg, M. D. Fibrilläres Oedem der Netzhaut nach Contusion mit einer Abbildung. Archiv f. Augenh. Bd. 52, S. 296-300. 1905.
3. W. Lohmann. München. Ueber Commotio Retinae, etc. Albr. v. Graefe's Arch. f. Ophth. Bd. 62, S. 227-249, spez. S. 236 below.
4. J. v. Benedek. Ein Beitrag zur Anatomie der präretinalen Hämorrhagie. v. Graefe's Arch. Bd. 63, S. 418. J. v. Benedek. Weitere Beiträge zur Anatomie der, etc. v. Graefe's A. Bd. 70, S. 274.
5. Haab. Über die Ophthalmoskopische Untersuchung im Aufdirecten Bilde mit indirekter Beleuchtung. Deutschmann's Beiträe der Augenh. 75 heft., S. 57-74.
6. A. Wagenmann. Die Verletzungen des Auges. 2 te Aufl. 9 Bd. 5 Abt. Graefe-Saemisch Handbuch. S. 564.
7. Chas. A. Oliver. Ophthalmoscopic representation of a case of traumatic rupture of the inferior temporal vein of the right retina. Annals of Ophth., Jan., 1897.

Buffalo, April 15th, 1916.

THE AMERICAN METHOD OF CATARACT EXTRACTION

BY DR. JUAN SANTOS-FERNANDEZ

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We intend to be brief but with the brevity required in this kind of work we shall develop our opinion without falling in tiresome details but missing nothing that would be pertinent to this paper, either by our own experience or by what we have seen from the best ophthalmic surgeons of Europe and the United States, the latter having created a distinct method of their own which could be fairly called the American method of cataract extraction.

When we began to study the diseases of the eye, the primitive method of couching the cataract had been abandoned definitely but there were some who were still afraid to perform the method first described by Daviel in 1752, and seconded by Mery, du Petit, Saint Ives and others that made the first extractions (1). von Graefe's imagination thought to solve the difficulties that were attributed to the corneal flap extraction by means of his method of peripheral lineal extraction with iridectomy. In this way the corneal flap was greatly shortened because in the peripheric lineal extraction, the sclera was also engaged and by practicing afterwards the iridectomy, the delivery of the lens was made easier. Before his premature death at Berlin in 1870, the illustrious master was able to see that his method, although it could pave the way for future work, did not outclass the classic method of Daviel, in which there was dissected a flap of half the cornea. For thirty years after von Graefe's initiative, the most noted surgeons of the last half of the 19th century, among which were Jacobson, Stellwag, Carrion, Panas, De Wecker, Galezowski, Critchet, Weber, Horner, Pagenstecher and others whose names do honor to the history of Ophthalmology, gave rise to many procedures based upon the idea of Daviel and on the initiatives of von Graefe; having in mind the intention of abolishing the real or supposed dangers of the large flap of Daviel.

Those fears were lessened or partly extinguished by the almost simultaneous discoveries of the application of local anaesthesia and antiseptics born from the discoveries of Pasteur and since then the percentage of statistics was very favorable concerning the loss of the eyes after the extraction of mature cataract free from complications.

During a score of years the eye surgeons made many efforts in order to avoid another obstacle that still persisted in spite of the

positive perfectness and which consisted in the dangers provoked by the increase in the intra-ocular tension and especially by the cortical material of the cataracts that appeared to have a complete evolution, and which gave rise to the increase in the intra-ocular tension by special conditions of the eye that did not reach to the class of glaucomatous tension. But as the cortical material when swelling reopened the borders of the corneal incision, even after six or eight days after the most perfect operation of cataract by the simple extraction, and not a few times this caused the partial or total herniation of the iris, to avoid this has been the great care of the later times, either by means of the irrigation of the anterior chamber or in other ways.

One of the first precautions has been to operate only on ripe cataracts without any cortical material, but even this is important in a way for it does not always avoid the accident. The absence of cortical material is not enough to guarantee the absence of other complications nor to consider an operated eye as immune from the dangers that rise from the increase in the intra ocular tension and in the hernia of the iris. The followers of conservative surgery above all believed that irrigation of the anterior chamber, thus clearing it of any cortical material, would be enough to avoid the dangers that were feared, but others with less scruples resorted to iridectomy because by the partial mutilation of the iris the feared increase of the intraocular tension could not produce its eventuation or other complications.

Following again a conservative opinion, that of avoiding iridectomy suture of the cornea (2) was evolved without omitting irrigation of the anterior chamber, although against this last procedure there has risen some opposition.

This appeared to have solved the problem and more so when other thinkers believed more rational the substitution of the corneal suture by the conjunctival flap (3) that had been practiced by Desmarres, but with other object in mind. The conjunctival flap maintains together the borders of the corneal wound, the same as the suture of the cornea and equally avoids the herniation of the iris, being besides of easy practice as well as free from any complications. It has been experimented more or less by numerous ophthalmologists, among whom were: Landolt, Snellen, Morax, Czermak, Wecker, Fuchs, True, Axenfeld, Elliott, Blanco, de Laperousse, May, Weeks, Arnold Knapp and others.

It looked as if the question could be limited either to the corneal suture or to the practice of the conjunctival flap, without exclud-

ing in either method the irrigation of the anterior chamber if necessary, but at this time one of the more ardent defenders of the corneal suture, Valude of Quinze Vingt (4), Paris, associate of Chevalereau and Kalt, who has been making it since 1894, declares himself vanquished and acclaims the combined extraction, being convinced now that it is the most safe procedure, after having experience in all.

We do not doubt this to be an absolute truth, and we have seen it more than once in our own practice, but we thought it to be an anti-conservative and complicated method because iridectomy is more hard to perform than the simple extraction, because for this last operation the only instruments required are a lid elevator, a knife and the fixation forceps. Even the assistant may be omitted, which is indispensable in order to make an iridectomy if we do not want to expose ourselves to a laceration of the iris if the patient is not obedient or oversensitive.

The combined extraction followed by the irrigation of the anterior chamber was seen by us frequently at New York in 1909, when we accepted the courteous invitation which was tendered us by the American Academy of Ophthalmology and Oto-Laryngology and we have alluded to this practice several times in our own papers (5). In this year we have seen the combined extraction with conjunctival flap done by the ophthalmic surgeons of New York as if they had one and all agreed to do it and the iridectomy is done alone when the cataract is immature, so that when the time for extraction arrives they have that saved.

This unanimous tendency in a large number of surgeons that could not have agreed upon that, could not have been due but to the fact that they have obeyed their own experience, anticipating themselves to what was done in some parts of Europe, and it clearly shows by a forced psychological deduction that they feel the necessity of renewing the ideas of the two masters of the 18th and 19th centuries, Daviel and von Graefe, that have been rendered more solid due to the discoveries that the other sciences have made. By all this we believe ourselves to have the right, as we said before, to consider cataract operation as it is practiced in the United States as the American method of cataract extraction, in which we have not once seen escape of the vitreous because this is a symptom that the American surgeons take great care to avoid. The combined extraction is more slow and requires greater ability on the part of the surgeon. It slightly affects the roundness of the pupil, that in some patients is almost unnoticed

but these objections are of small importance considering the sureness of the recovery of vision on the part of the patient whose eye runs the smallest possible risk.

In order not to accumulate many facts that would render this work very tedious we shall only mention the cases that show very evidently the security afforded by iridectomy and the danger run when it is not practiced.

An engineer who wanted the operation on his left eye to be done before its time, in order to avoid blindness before his right cataract became also mature, and thus avoid notoriety at his office, and in whom we were afraid to operate because of the rapid development of the cataract, was operated by us and we made the combined extractions as a precaution. After four days he was well, but when eight days had passed he complained of not seeing. We could not explain to ourselves this phenomenon but with the ophthalmoscope we were able to discover a pyramid of cortical material on the posterior capsule, which was reabsorbed without the smallest inconvenience. This would not have occurred if iridectomy had not been done.

On the second case we operated on the left eye of a colleague whose right eye had been operated before by us. The simple extraction was easily done and for eight or ten days the patient was feeling well but one morning he told us that he had suffered a short and severe pain during the night. We suspected what had happened: the pupil was slightly irregular and not rounded and on the next day the iris kept on herniating itself and it took sixty days to combat it because we did not want to excise it, being afraid of infection.

The third case clearly shows the advantages of the conjunctival flap and was that of a lady not over 45, who had a simple extraction made without any difficulties. We dissected the upper conjunctival flap without being afraid of its size, the larger the better, and afterwards for four days the patient was feeling well but the anterior chamber was filled with cortical material. We trusted in the flap and in the absence of any inflammation and let her go home on the fourth day, for she lived in another town. She came back in 30 or 40 days and the cortical material had disappeared and later on she obtained perfect vision.

From what we have said we can gather the following: There is an unanimous tendency towards practicing the combined extraction and while this is generalized we can make the following conclusions:

I. That although cataract operation has reached its greater perfection it has slight inconveniences that often give rise to the fear that the best operation can be lost. The fears of complication, however remote, are abolished with the combined extraction together with the conjunctival flap.

II. In any case of non-recent senile cataract with no cortical material, the simple extraction is enough if there is also made a conjunctival flap.

III. The suture of the cornea in cataract extraction can be made by those surgeons who are accustomed to it and in the cases that they consider it necessary.

The operation for cataract at this time is based upon the methodical compend of all the advantages and could be called the "American method."

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THE INTRACAPSULAR AND THE CAPSULOTOMY OPERATION FOR SENILE CATARACT.*

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CHICAGO

I appreciate the great honor the Milwaukee Oto-Ophthalmic Society has conferred upon me by its invitation to read a paper upon the extraction of a cataract in capsule, and I feel that I am assuming a very great responsibility in accepting it.

Your society would not be interested in a description of the classical operation of removing a cataractous lens after opening the capsule, but I believe all of you will welcome any suggestion that will lessen the complications following a cataract operation and offer better visual results.

In this short paper I will endeavor to point out the difference between the intracapsular operation, as performed by Lt. Col. Smith in Amritsar, India, with the author's modification of it, and the capsulotomy method. I am familiar with the complications that may follow the capsulotomy method because, I believe, I have experienced practically all of them.

Some operators seem to underestimate the danger to vision after a cataract operation by the capsulotomy method, and many magnify the complications when the intracapsular operation is performed. Having operated upon seven hundred eyes by the intracapsular method, one hundred of which were done in Chicago, it appears to me that I have had sufficient experience upon which to base an opinion regarding this operation, and, having had extended experience with the capsulotomy operation and recognizing its value, I feel that I am justified in comparing the two methods.

PREPARATION OF THE PATIENT: The preparation of the patient for a cataract operation is the same in either operation except that I use cocaine only twice in the intracapsular operation, while most operators in the capsulotomy method use it more often.

CLEANSING OF THE CONJUNCTIVAL SAC: In the usual operation the speculum is used, and the eye is flushed with boric solution by means of an eye dropper, whereas in the intracapsular operation the lids are held away from the eyeball with retractors and three ounces of a warm solution of 1 to 2000 bichloride of mercury is allowed to flow into the conjunctival sac from an irrigator suspended two feet above the patient's eyes. Figures 1, 2, 3, 4, 5, 6.

*Read by invitation before the Milwaukee Oto-Ophthalmic Society, March 21, 1916.

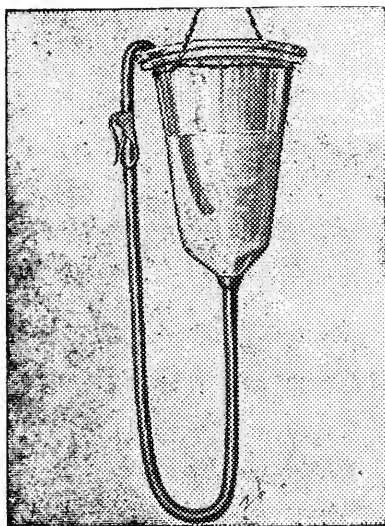


Figure 1. Irrigator.

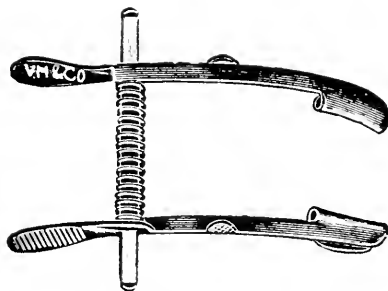


Figure 2. Eye Speculum.



Figure 3. Upper Lid Hook.



Figure 4. Lower Lid Hook.

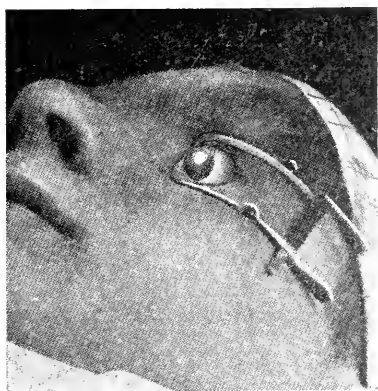


Figure 5. Beard's Ophthalmology.

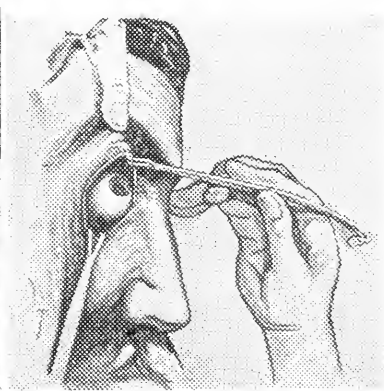


Figure 6.

Figure 5. CAPSULOTOMY METHOD: The eye lids are held apart by a speculum while the eye is flushed with a boric solution by means of a medicine dropper. The advantage that the lid hooks offer for cleansing the conjunctival sac, can be seen by comparing with figure 6.

Figure 6. INTRACAPSULAR METHOD EXPOSING THE ENTIRE CONJUNCTIVAL SAC: The lids are held away from the eye ball and flushed with three ounces of bichloride solution 1-2000 from the irrigator, which has a great advantage over the method of cleansing the conjunctival sac, represented in figure 5.

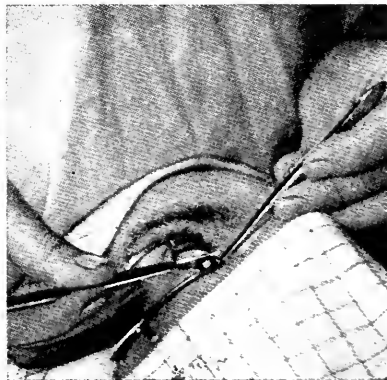
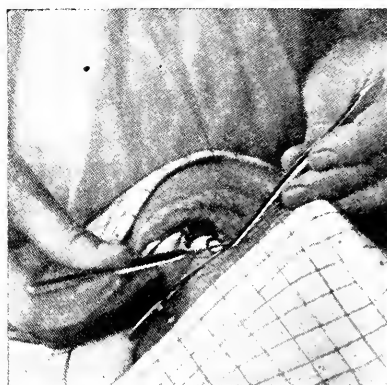


Figure 7. Beard's Ophthalmology.

Figure 8. Beard's Ophthalmology.

Figure 7. CAPSULOTOMY METHOD: The speculum is holding the lids apart, resting lightly upon the globe while the incision is being made.

Figure 8. CAPSULOTOMY METHOD: A continuation of figure 7. If the operator hurts the patient or because of fright or any other reason, the patient squeezes his eye lids the speculum may press upon the globe and cause great damage before it can be removed. By comparing figures 7 and 8 with figures 9 and 10 it is plain to see that one of the greatest sources of danger has been eliminated by discarding all kinds of specula when operating for cataract by any method.

THE INCISION: In the capsulotomy method the eye lids are usually held open by an eye speculum (figures 7 and 8), while in the intracapsular operation the retractors are used (figures 9 and 10).

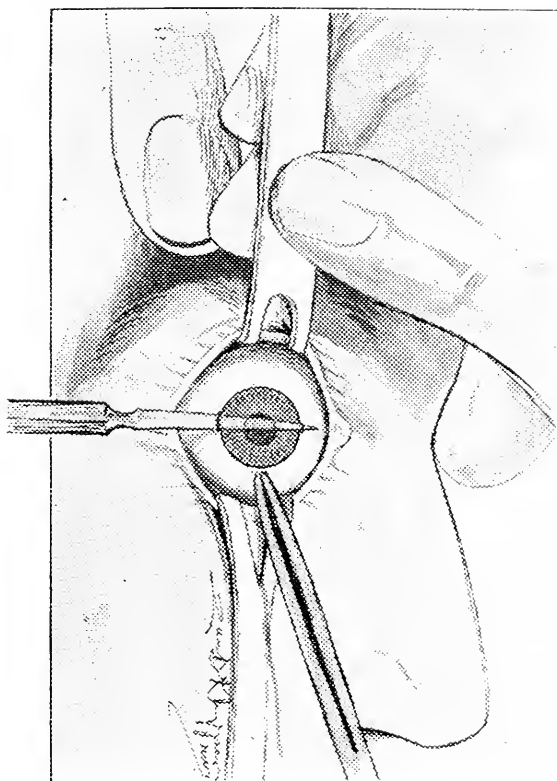


Figure 9.

Figure 9. INTRACAPSULAR METHOD: An assistant is standing in the correct position, on the left side of the patient, holding the upper lid up with author's double hook in his right hand and the lower lid down with author's lower lid hook in his left hand. A second assistant or nurse is holding up the brow with the thumb. In this position the first part of the incision is made.

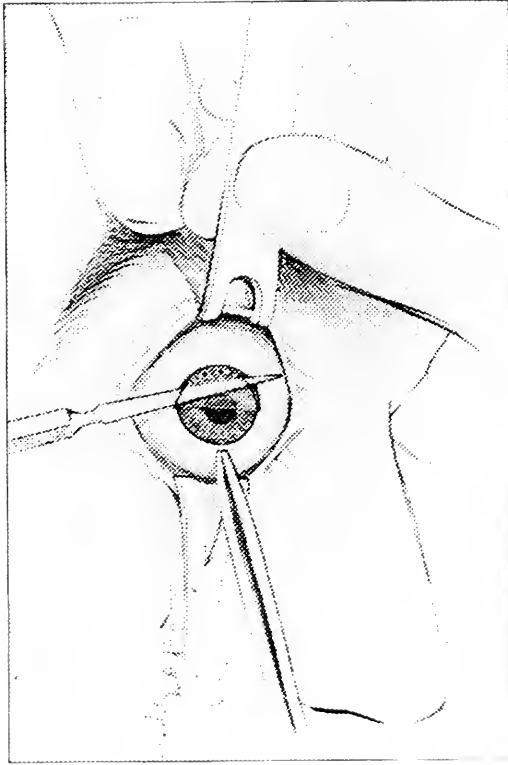


Figure 10.

Figure 10. INTRACAPSULAR METHOD: A continuation of figure 9. The incision is being finished. It is practically impossible for the patient to produce any pressure upon the globe while the incision is being made, or during any part of the operation that is to follow. Compare figures 7-8. This part of the technique can be used to advantage in removing a lens by any method.

In either operation the operator makes as good an incision as he can. Some prefer a conjunctival flap; others make the incision entirely in the cornea. The principal object in either operation is to get a deep puncture and counter puncture, in order that a large opening may be made for easy lens delivery.

The corneal incision is not as difficult for beginners as is a conjunctival flap, and can usually be made by skilled operators with one sweep of the knife. The conjunctival flap does not seem to have any advantage over the corneal section, and has some disadvantages. With either, union is usually prompt unless delayed by too frequent dressing.

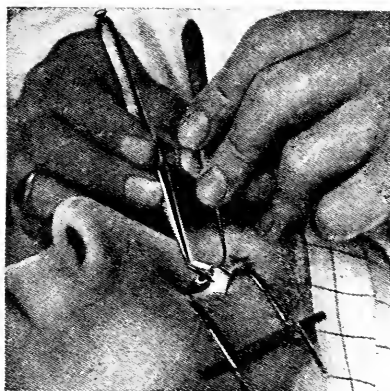


Figure 11. Beard's Ophthalmology.

Figure 11. THE IRIDECTOMY CAPSULOTOMY METHOD: The iridectomy is usually made with the speculum holding the eye open and the patient looking down, when the iris forceps are introduced closed, opened in the eye, the iris grasped, pulled out, and cut with scissors. Some operators cut the iris without fixing or holding the eye, which has its dangers, because the patient may look up and cause the forceps to be pushed into the lens; or he may squeeze his eye and cause the speculum to do irreparable damage. This method of cutting the iris necessitates the introduction of one more instrument into the eye than is required in the intracapsular method. Compare with figure 12.

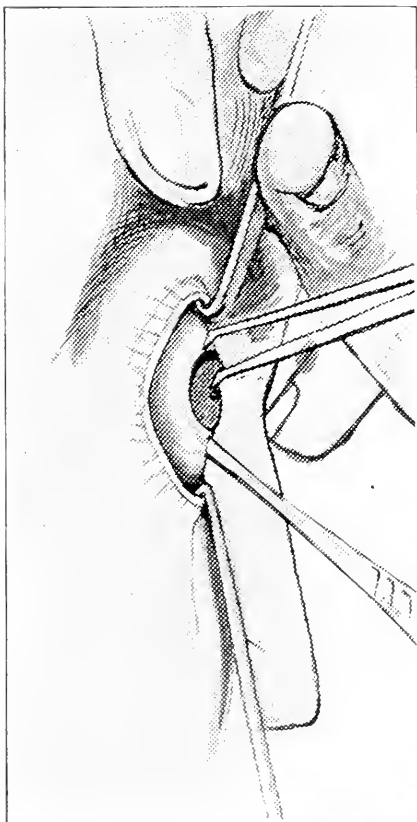


Figure 12.

Figure 12. IRIDECTOMY INTRACAPSULAR METHOD: The eye is held open with the author's retractors in the same manner as when the incision was made. An assistant grasps the eye gently with forceps and holds it steadily while the operator places a Smith iris forceps without teeth perpendicularly upon the cornea. The upper blade is placed just above the corneal incision and the lower just below the upper edge of the pupil, when a little pressure is applied upon the lower blade which is brought upward, pushing the iris out when the two blades come together, the iris is caught, gently pulled out, and cut with scissors. It is practically impossible for the patient to cause any trouble at this time while, in the iridectomy described in figure 11, a serious accident might occur from pressure of the speculum. One less instrument is introduced into the eye and a fair trial will demonstrate its worth. Compare with figure 11.

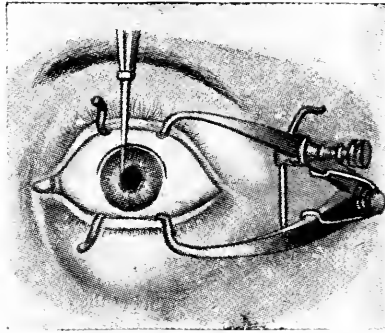


Figure 13. Beard's Ophthalmology.

Figure 13. CAPSULOTOMY: In the capsulotomy method the capsule is now cut with the cystitome, or a piece of it is removed by capsule forceps whereas in the intracapsular operation this part of the technique is omitted and one less instrument is introduced into the eye.

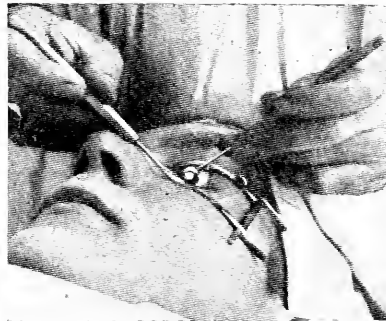


Figure 14. Beard's Ophthalmology. Figure 15. Beard's Ophthalmology.

LENS DELIVERY: In the capsulotomy method the lens is removed by pressure after the capsulotomy has been made, figures 14-15.

Figure 14. CAPSULOTOMY METHOD: Delivery of the lens by capsulotomy method with the lids held apart by a speculum. The patient must look down in order that any instrument can be placed above the corneal section with the operator standing behind the patient's head. This is very difficult for some patients to do because the natural tendency is to look up when the eye is being operated upon.

Figure 15. A continuation of figure 14. Should the patient make pressure upon the globe at this time, or a loss of vitreous occur from any cause, the speculum must be removed, and the lids held away from the globe in some other manner. This is a very awkward situation, providing the lens has not been delivered. Compare with figures 16-17-18.

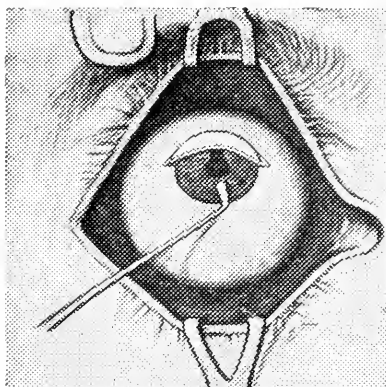


Figure 16.

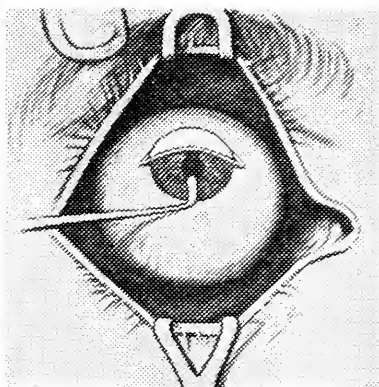


Figure 17.

Figure 16. LENS DELIVERY INTRACAPSULAR OPERATION FIRST POSITION: IMMATURE CATARACTS: The lids are held away from the eye ball as when the incision was made. The capsulotomy has been omitted and pressure is being made with a small tenotomy hook directly backward towards the optic nerve. The zonula has broken above and the lens is presenting in the corneal incision.

Figure 17. INTRACAPSULAR OPERATION: IMMATURE CATARACT: A continuation of figure 16. The lens is advancing, pressure is being made continuously toward the optic nerve. When the lens has passed the equator it does not require any more pressure and is hooked out as in figure 18.

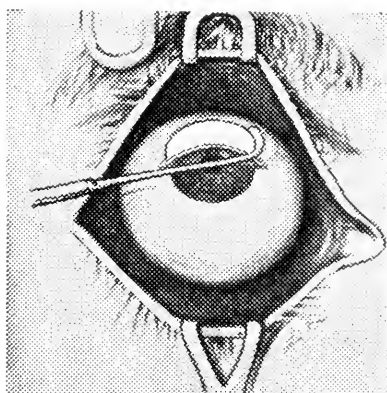


Figure 18.

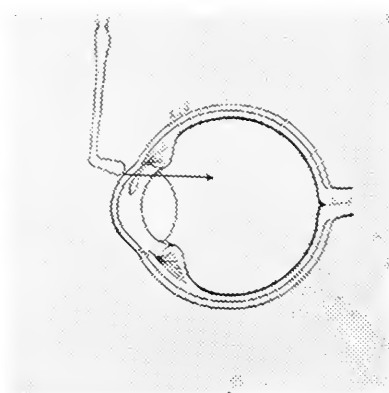


Figure 19.

Figure 18. INTRACAPSULAR OPERATION: A continuation of figure 17. The lens is hanging in the corneal wound when all pressure is removed, the point of the hook is directed upward to keep it from engaging in the incision. The hook is now pulled across the corneal wound under the lens, completing the delivery.

Figure 19. INTRACAPSULAR OPERATION: Drawing by Dr. Vail. A cross section showing the direction of the pressure in the upright delivery or when operating upon immature cataracts. Compare 16, 17, 18 with 14 and 15 and note the danger that might be caused by the speculum, especially when it is necessary to make the patient look down, which of itself is dangerous. It is not necessary for the patient to look down in the intracapsular operation.

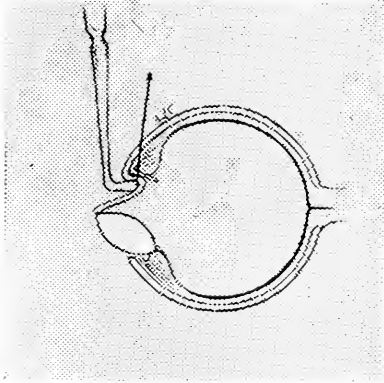


Figure 20.

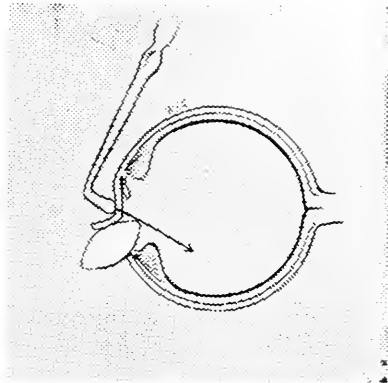


Figure 21.

Figure 20. INTRACAPSULAR OPERATION TUMBLERS: Drawing by Dr. Vail. First position in the intracapsular operation when the lens is mature or hypermature and it is desirable to break its zonula below, turn it over, and let it come out upside down. It would be practically impossible to successfully remove a lens in this manner with the lids held by an ordinary eye speculum. All pressure must be kept away from the globe. The point of the hook is caught on the ciliary ridge and the pull is made downward, until the zonula has broken below and, when the lens has turned over, the pressure is changed from a pull down to a slight push up, tucking the cornea under the lens, figure 21.

Figure 21. Drawing by Dr. Vail. A continuation of figure 20. The cornea is pushed under the lens and, when it is hanging in the corneal wound, all pressure is removed and the lens removed as in figure 18.

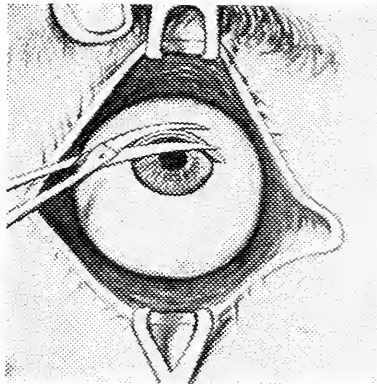


Figure 22.

Figure 22. PROLAPSE OF VITREOUS AFTER THE LENS HAS BEEN DELIVERED: INTRACAPSULAR METHOD: The lids are held away from the globe by the author's retractors in the same manner as when the operation was begun, the lens has been delivered, a loss of vitreous has occurred, and is being cut off with scissors. The lids must be held away from the globe while this is being done. When this is finished, the patient is requested to close his eyes with the hooks under the lids. When the eye is closed, the hooks are removed; the upper one first. With the lids held away from the globe in this manner a slight loss of vitreous after lens delivery does not usually cause complications. Loss of vitreous is rare when the lids are held in this manner and, when it occurs, the operation can be finished without changing instruments. When this accident occurs in the capsulotomy method with the speculum holding the lids, it must be removed, and the lids held in some other manner. Some vitreous will be lost removing the speculum, and some more while inserting some form of retractor under the upper lid, but, if the author's hooks are used from the beginning of the operation until it is finished, this complication will be minimized.

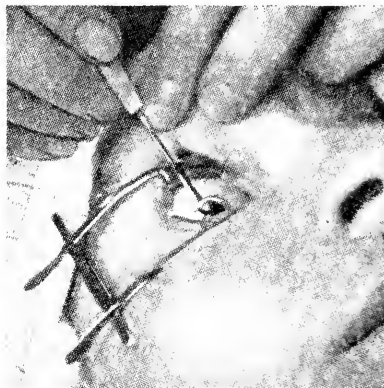


Figure 23. Beard's Ophthalmology.

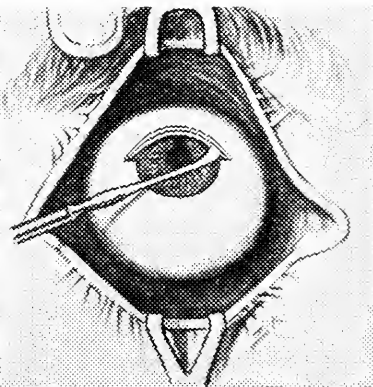


Figure 24.

Figure 23. TOILET CAPSULOTOMY METHOD: The lids are being held away from the eye ball with an eye speculum and the patient is requested to look down, when the iris replacer is passed into the corneal wound and the iris is tucked back. The fact that the patient must look down is sufficient to make the toilet difficult because the iris is forced into the incision but, when the patient looks up, it is released. Compare with figure 24.

Figure 24. TOILET INTRACAPSULAR OPERATION: All pressure is removed from the globe by author's lid hooks in the same manner as when the operation was begun, the patient usually looks up and, if not, he is requested to do so when the iris replacer is passed into the incision, the iris is pushed away from the puncture and counter puncture and the patient is requested to close his eyes with the hooks under the lids. When the lids are closed, the hooks are removed, the upper one first and the eyes bandaged. The iris is more readily replaced when caught in the edges of the wound if the patient is looking up, than when looking down, as in the capsulotomy method, and there is much less danger of vitreous loss. Compare with figure 23.



Figure 25.



Figure 26. Smith-Fisher Instrument.

Figure 25. CAPSULOTOMY METHOD LOSS OF VITREOUS PRECEDING LENS DELIVERY: Loss of vitreous occurring anytime during a cataract operation is considered by most operators as a complication to be feared; but, if vitreous appears before the lens has been delivered, the complication is very much more serious, because more vitreous will be lost in extracting the lens. When such an accident occurs in the capsulotomy method, the speculum must be removed and the lids held in some other manner because it would be disastrous to attempt its removal with the speculum in place. More vitreous will be lost when removing the speculum and still more when introducing a retractor, or having the assistant hold the lids with his fingers. Which ever method is employed, if a loop is inserted into the eye to remove the lens, much vitreous is usually lost and such a condition is justly considered of very grave import. Compare figures 27-28.

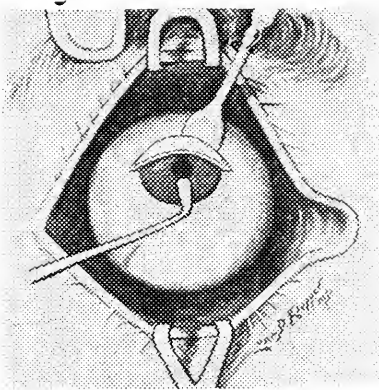


Figure 27.

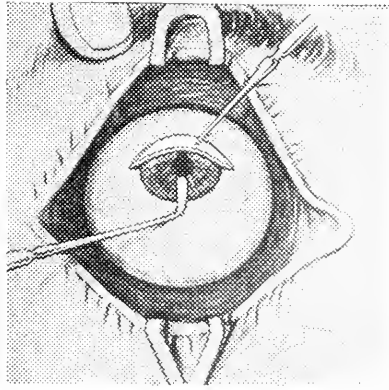


Figure 28.

Figure 27. SMITH'S METHOD WITH AUTHOR'S MODIFICATION OF OPERATING WHEN VITREOUS PRECEDES LENS DELIVERY: If loss of vitreous preceding lens delivery has occurred in the intracapsular operation, the lens is delivered by the Smith method with the lids held away from the globe by author's retractors, the same as in the beginning of the operation. Pressure of the hook is removed, the Smith spoon, figure 26, is passed down behind the lens and pressure is then made with the hook upon the spoon toward the optic nerve, when the lens is made to slide up the spoon and out. Compare this technique with that of the removal of a lens with the loupe.

Figure 28. AUTHOR'S METHOD OF OPERATING WHEN VITREOUS PRECEDES LENS DELIVERY: Loss of vitreous preceding lens delivery has occurred in the intracapsular operation, the lids are being held away from the globe by author's lid hooks, the same as when the operation began. The author's needle, figure 26, which was held in the left hand waiting for such an accident, is stuck into the edge of the lens, and, with just a little pull upward, together with slight pressure upon the cornea with the hook, the lens either comes out in capsule or the capsule ruptures.

THE BANDAGE AND AFTER-TREATMENT BY THE CAPSULOTOMY METHOD: After the capsulotomy method, both eyes are usually bandaged for twenty-four to forty-eight hours, at which time the operated eye is inspected and, if all is well, it is flushed with boric acid solution, 1% atropine is instilled, the eyes are rebandaged, and redressed in the same manner daily till the bandage is omitted, usually from the unoperated eye about the fourth or fifth day, and from the other a week later. If a prolapse of the iris is found at the first dressing after the capsulotomy operation, it is usually cut off.

THE BANDAGE AND AFTER-TREATMENT INTRACAPSULAR OPERATION: After the intracapsular operation both eyes are covered with carefully prepared yellow oxide ointment (eight grains to the ounce) squeezed out of a tube, a sterile dressing, composed of six thicknesses of gauze cut to cover both eyes and with a notch for the nose to prevent slipping, is applied and over this a starch bandage without making any pressure, after which the patient is put to bed the same as after the capsulotomy method.

When the starch bandage has set, or becomes dry, it may be too tight, or too loose, and should be cut under the ears and the two ends stitched together. If too tight, it is made loose and, if too loose, it is tightened. If the patient does not complain the bandage is not disturbed until the ninth day after the operation when if all has gone well, the wound will be closed and it may be discontinued and dark glasses prescribed.

The dressings may be changed any time they become displaced or are uncomfortable; but no good and much harm may follow

the inspection of the eyeball. Too frequent dressings are undesirable and when changes are necessary strict surgical cleanliness must be observed.

The bandage should be removed from the unoperated eye if the patient becomes delirious and, if he cannot see with the unoperated eye, the bandage must be removed from the one operated upon. It is not necessary that patients remain in bed nine days after the operation, but it is desirable that both eyes should be bandaged that long. They may walk to the toilet as often as necessary after twenty-four hours have elapsed after the operation and may be allowed to sit up part of each day.

If a prolapse of the iris is noted at the first dressing on the ninth day after the operation; it is not cut off as would usually be done after the capsulotomy method; but the eye is rebandaged for four more days, when the protruding portion is cut off. The eye must not be held with fixation forceps when this is done, because any sudden movement of the eyeball while being held during the cutting might open the wound and invite infection. If at any time the patient complains of pain and it is necessary to remove the bandage, a fresh one should be applied with the same care as after the operation unless the lids are swollen when it is advisable to inspect the eye and, if infected, steps should be taken to combat it; but the less the eye is inspected the less often will infection occur.

COMPLICATIONS DURING EXTRACTION: Ophthalmic surgeons are all familiar with the complications that may occur when a cataract operation is performed by the capsulotomy method, and these same complications may accompany the intracapsular operation.

When a lens is removed by the capsulotomy method, post-operative inflammation and secondary operations are much too frequent; but when the intracapsular operation is performed these complications are practically absent.

WHY DO MOST OPERATORS IN THE UNITED STATES PREFER THE CAPSULOTOMY METHOD: The proposition is a very simple one. It is impossible to successfully perform an intracapsular operation unless the whole technique is adopted, and, if a competent operator attempts the removal of a lens in its capsule without understanding Smith's technique or having a good working knowledge of the author's lid hooks, the Smith spoon and author's needle, he will soon come to grief; because anyone thus beginning the removal of a lens in capsule will have an abnormal number of cases where vitreous presents before the lens is delivered, and, if he is not master of this complication and must resort to the old method of

removing the lens with a fenestrated loop, he cannot be expected to successfully perform the intracapsular operation.

I believe that operators of large experience as well as beginners would increase their average vision if they would adopt the intracapsular operation in all cases of senile cataract, providing they would discontinue the use of eye specula, and familiarize themselves with the new technique as I have described it in a paper read before the Chicago Ophthalmological Society March 15, 1915, and published in *Ophthalmology*, July, 1915, entitled, "*A New and Safe Technique for the Cataract Operation.*"

CONCLUSIONS: The Smith technique with the author's modifications has many advantages over the capsulotomy method and mentioned in the order of operating are:

- 1st. Less cocaine, which is an advantage.
- 2nd. Flushing of the conjunctival sac with 1-2000 bichloride of mercury, the method of application of which needs only a trial to be convincing.
- 3rd. The incision in the cornea has many advantages and is easier to perform.
- 4th. The iridectomy as performed and original with Smith has great merit because the iris forceps is not inserted into the eyeball and should appeal to all.
- 5th. Capsulotomy with its complication is omitted.
- 6th. The lens delivered in capsule is one of the greatest achievements in ophthalmic surgery. Most operators have done it accidentally, but Smith should have the credit for developing a safe technique.
- 7th. If a prolapse of vitreous occurs, intracapsular technique offers the safest method for its treatment.
- 8th. The toilet is a very important part of the technique and has many advantages, if made by the intracapsular method, because all pressure is removed from the globe and when the patient looks up toilet is facilitated.
- 9th. Removal of the lens when vitreous has been lost, or is presenting is infinitely safer in the intracapsular than by the capsulotomy method.
- 10th. Removing the bandage and inspecting the eye too early often results in complications.
- 11th. Last but one of the greatest advantages of the intracapsular operation is that it is not necessary for the patient to be blind before operation: unripe or immature senile cataracts are easier of extraction than ripe or mature ones and offer better vision:

because they can be operated before the patient is blind when his health and spirits are good.

Finally, I believe that every point in the Smith technique with the slight modifications I have made could be adopted in the capsulotomy method and increases the average vision after cataract operations, whether performed by experienced or inexperienced operators and if the technique is mastered, many lenses will be removed in capsule, that are now operated by the capsulotomy method.

The technique of holding the lids can be mastered upon cocaine-ized human eyes, and that of the author's needle, Smith spoon, the incision and iridectomy upon four weeks' old kittens' eyes which have a cornea about the size of that of human eyes, and are probably the best substitute possible. The cat's eyes must first be removed and placed in a mask because they are too deeply set to be operated upon. There seems no valid reason why any operator cannot familiarize himself with the intracapsular technique, as has been described, before attempting to operate upon human eyes. One of the greatest obstacles to the intracapsular operation has been the misunderstanding of its technique, especially that of the removal of the lens when loss of vitreous was imminent or actually had occurred.

When a cataract is removed in its capsule, the best operation that could have been done has been performed, the patient being practically free from danger of infection and post-operative inflammation. As it will not be necessary for him to have a secondary operation, he may look for his vision to be good and remain so, whereas, if the capsulotomy operation had been performed, it is often necessary to do a secondary operation, and even after that he cannot be assured that the opening in the capsule will not close

31 N. State St.

A NOTE ON THE COLOR SENSE IN RELATION TO THE EMOTION OF SEX.

BY GEORGE HENRY TAYLOR, L. R. C. P. S.

SYDNEY, N. S. W., AUSTRALIA

A percentage of human beings and birds have in common an inherited emotional factor which finds its expression in musical sounds. In bird life the musician is a male, excepting the rare case where a caged female bird exhibits the emotion of a song. Inherited emotion in each variety of singing bird is expressed in a sequence of notes peculiar to itself, although the quality of the note may vary a little in different birds. By the selective breeding of caged birds the quality of the note can be improved. For example, by mating finches of different varieties, the offspring acquire a song which is a blend of the notes in the song of the male bird in each variety. Such birds are not fertile. No doubt the female bird admires with a keen appreciation the color or song of her male, but it is doubtful whether the color or song of the male bird is a delight to any other bird of his sex. A bird in a cage when singing appears to be in a state of rapture, and does not then give an observer the suggestion of intelligence as it does when with the head aslant it is alert and observant.

The period of sexual activity in singing birds alternates with a longer period of sexual calm, when male and female are associated in what is practically an asexual state. The sex song, therefore, of a singing bird is an emotional expression on the part of the male, sung under similar conditions season after season. There is an absence of persistent sex-brooding of the human male and female, which extends throughout the sexual period of their life. The environment of the bird may change, but so slowly that it is practically the same year after year. The environment of the human unit, on the other hand, is comparatively unstable. The human male also appeals to the female through the emotions of song and color, though he is more promiscuous in his loves than is the singing bird. The non-creative musical male interprets the appeal of musical sounds according to his degree of emotional appreciation and expression.

The development of mind in human beings places male and female frequently on the same intellectual plane, and association on that plane may simulate a feminine element in the male, or a male element in the female, and occasionally the latter creates

new manifestations of emotion in color and music. But as a rule the female is appreciative of the emotion of music, and not creative of music itself. It is further to be noted that in birds color and music are usually apart. The bird of brilliant plumage is nearly always songless, whilst the smaller singing bird is more frequently associated with somber feathers. The description I have given in former notes of the expression of emotion in a colorblind person, shown in his face and voice, was drawn from an extensive experience of men, who, from a color and musical standard, might be termed primitive persons. A much less extensive experience apart from this class suggests to me that when a person is blind to red and green, and also indifferent to music sounds, the condition I then described in regard to the voice is accentuated. I infer, therefore, that when a person with a keen appreciation of musical sounds is blind to red and green there still may be a degree of color recognition through sound. When a person blind to red and green is in contrast to a person with a keen color sense, immediately prior to examination by Holmgren's Wools, the condition common to each mind is a degree of expectancy. The fact and attitude of the red green blind is suggestive of a person who is listening; the face and attitude in the other of a person who is watching.

In my small experience of musicians, I recognize two types: a color type which is bright and joyous, to instance Mozart, and a type which is introspective and gloomy with a comparative indifference to external objects, of which Beethoven may be taken as an example.

A man may be regarded as having a normal color sense when he can recognize and name correctly red, green, white, gray yellow and blue, under varying conditions of light and shade. A person may name a color correctly and yet not recognize it in the sense that a color normal person does. Men differ in the alertness and accuracy of their perceptions, so that persons with an equal degree of color defect may vary considerably in the correctness of their answers. An analogous condition is to be observed when testing the vision of employees. When two engine drivers, after careful examination have been proved to have a similar defect in vision, are tested with semaphore arms at varying distances, one will be more correct in his answers than the other. A number of apparently color normal men have much difficulty in distinguishing between pale blue and green. To have, from an emotional standpoint, a full color sense, a person should not only be able to name

and recognize color, but should also have a sense of tune. An ordinary man has little more than a recognition and appreciation of simple tune, and such tunes as he can whistle or hum. A person who has no sense of tune or is indifferent to tune approximates in his emotional condition to the color blind, particularly in regard to the expression of emotion by the voice.

TWO THOUSAND CASES OF REFRACTION ANALYSED WITH REFERENCE TO THE AVERAGE FRE- QUENCY AND TO THE ASTIGMATIC AXIS.

H. C. PARKER, M. D., F. A. C. S.

DUBUQUE, IOWA.

Three papers on a similar subject have recently appeared, two by Newcomb^{1 2} and one by Durand.³ The conclusions reached by the two observers were so radically different that I was stimulated to look up the statistics of two thousand unselected cases of refractive error which had occurred in my private practice. These cases were taken from my records after my fifth year in practice with the thought that latterly I have done better refraction. The total number of cases analysed is, to be exact, 1942. Of these 1942 cases, 1212 were examined under a cycloplegic, either 1% homatropine with $\frac{1}{2}\%$ cocaine or $\frac{1}{2}\%$ atropine. The cycloplegic examinations were then 62+%. The remaining 730 cases or 38%, were "natural" cases and were largely made up of presbyopes. My table of percentages in this series was found to be as follows:

A comparison of percentages follows:

Error.	No. of Cases.	Per Cent.
Comp. Hm. Astig.	796	41.0
Simple Hm.	518	26.6
Simple Hm. Astig.	149	7.7
Comp. My. Astig.	168	8.6
Simple My.	45	2.3
Simple My. Astig.	60	3.0
Mixed Astig.	154	8.0
Normal	52	2.7

A comparison of percentages follows:

	Gould, 2500.	New- comb, 1000.	Durand, 500.	Hart- shorne, 510.	Author, 1942.
Comp. Hm. Astig.....	59.3	34.1	60.2	58.8	41.0
Simple Hm.	0.2	8.9	0.2	1.0	26.6
Simple Hm. Astig.....	7.6	3.6	10.8	5.0	7.7
Comp. My. Astig.....	13.3	23.5	13.4	10.8	8.6
Simple My.	0.0	3.6	0.0	0.2	2.3
Simple My. Astig.....	1.7	2.4	0.8	1.4	3.0
Mixed Astig.	2.9	23.6	1.6	4.1	8.0
Normal	0.0	0.3	0.0	0.0	2.7
Miscellaneous	14.8	0.0	13.0	18.6	0.0

From the above table of percentages it would seem that there is a wide difference between the findings, with the exception of those of Gould and his two former assistants, Durand and Hartshorne. A little further study and an explanation, in particular as to two percentages of mine, will make it evident that they all

are very much alike with the exception of Newcomb's. In my list I have no miscellaneous column for the reason that I threw out all cases so classified by the others, but have included a small number of normal cases. These cases were not necessarily absolutely emmetropic, but cases in which I considered the error so slight as not to justify glasses, and in nearly every case I have verified this by observation at periods of from one to three years following the test. In my list it will be noticed that I have a very high percentage of simple hypermetropia. This percentage actually is much too high, but means simply that it is the list of patients whom I have fitted with simple plus spheres, and have ignored the .12D, or in some instances the .25D, of astigmatism that has been found in combination with the hypermetropia. Many observers will think me wrong in this, but I disagree because I have repeatedly verified that the omission of very low corrections of astigmatism in compound hypermetropic cases does not in any way affect their relief from symptoms formerly complained of. With the explanation of these two differences in mind it will be readily seen that my percentages much more closely resemble all the others except Newcomb's, and further analysis will show a greater similarity.

Taking of all Gould's cases showing hypermetropia the percentage will be 67.1%. All Durand's cases show 70.4% hypermetropia. Hartshorne's list shows 64.8% hypermetropia and mine show 74.3% hypermetropia. Newcomb's, on the contrary, shows but 46.6% hypermetropia, all other mixed or some form of myopia. My percentage more nearly approaches Thorington's generalization "that four cases out of every five are hypermetropic." Newcomb's low percentage of 46.6% is 20% lower than the next lowest and 30% lower than mine. It would seem therefore that, as Durand suggests "some one method scientifically applied must become the standard or else the reputation of the profession will continue to suffer as it has in the past."

Newcomb's 23.6% of mixed astigmatism is three times greater than the next highest, which is mine at 8%. Durand's is the lowest at 1.6% but may be explained somewhat by the age of his patients, they being largely young people, and possibly also by their racial characteristics, but I can't reconcile myself to Newcomb's high percentage, over 53, showing mixed astigmatism or myopia out of a thousand adult refractions. I attribute it to his reliance practically entirely on his retinoscopic findings without resorting to his trial lenses and test cards.

THE AXIS OF ASTIGMATISM.

As to the second part of my title, the axis of astigmatism, I have rarely seen mention of this in text books or monographs. Many years ago I used Verhoeff's astigmatic charts as a supplement to retinoscopy and the trial case in the estimation of refractive errors. I modified them later, and reported them in the *Archives of Ophthalmology*, July, 1908. By the use of either Verhoeff's charts, or in my hands my modification of them, the axis of the astigmatism was "off axis" so frequently, that is neither 90 nor 180, that I compiled the percentages in this series of 1942 cases.

In the 1942 cases I found 132½ to have some form of astigmatism, not counting those cases previously mentioned in which the amount of astigmatism was in my opinion too insignificant in amount to be given in the correction.

Of these 132½ cases I found 829 or 62% "off axis." I believe such a high percentage shows accurate refraction, and it is my contention that such will be more frequently found if some modification of the old clock dial chart is used as a routine procedure, with the test letter cards. In Verhoeff's radiating line chart, the lines are placed at 15° intervals, in mine at but 10° intervals. The latter permits of more accurate work, as, for instance, if the lines at 100° and at 110° are seen equally clearly, 105° will be the axis if the astigmatism is hyperopic and 15° if the astigmatism is myopic.

This report is presented in no spirit of antagonism but simply that discussion or profit may come from what is herein contained.

1. Newcomb. *Ophthalmic Record*, May, 1913.
2. Newcomb. *Annals of Ophthalmology*, April, 1915.
3. Durand. *Ophthalmic Record*, September, 1915.

Abstracts From Recent Ophthalmic Literature

AMBLYOPIA AND BLINDNESS

THE BLIND AND THEIR SENSE-CAPACITY.—SEASHORE, CARL E. (*The Outlook*, May 17, 1916). Perhaps a note on the relative sensitiveness of the blind according to accurate measurements would be of interest to your readers in connection with the communications from the blind in recent numbers of *The Outlook*.

It seems to be generally assumed that when the blind person is forced to use the senses of touch and hearing in place of sight he develops an unusual sensitiveness in these; witness the rather astonishing keenness of touch the blind person shows in reading raised print with his finger-tips and accurate orientation in space through hearing.

Through certain experiments in the psychological laboratory and incidental tests upon blind persons it has gradually dawned upon me that a distinction should be made between sensitiveness and ability to use a sense—in other words, between native sensory capacity of the sense organ and the acquired ability to use that capacity. In a preliminary way I found that blind persons who had gained excellent skill in the reading of raised print and in special adjustments through hearing were no more sensitive to touch or to the hearing of direction of sound than I was.

The tests were, however, so devised that they should be equally fair to the trained and the untrained. For instance, one test of touch consisted in the ability to locate with the finger-tip a hair placed under a sheet of paper on a glass plate. The only question put was this: Where is the hair? In the first test I used a human hair two inches long, and the blind person was able to locate it under thirty-two sheets of twenty-pound bond writing paper. That seemed but a natural performance for a blind person. But behold my surprise when I tried it myself and found that I was able to do even better!

To put the matter to further test, one of my students, Mr. T. Ling, made an extremely careful series of measurements upon fifteen pupils in the Iowa School for the Blind, selecting the most advanced students of high school age who had been trained as pupils in the School for the Blind for more than five years. Fifteen pupils of the Iowa City High School were selected for comparison with

these. On these two groups of fifteen each he made six sets of measurements as follows: (1) to locate a hair covered with paper; (2) to determine how far apart two points touched must be to be felt as two—(a) on the finger-tip of the first finger of the right hand, and (b) on the forearm just above the wrist; (3) the ability to determine by lifting with the finger-tips which of two weights was the heavier; (4) to tell whether at a given moment a five-gramme pressure upon the finger-tips was increased or decreased; (5) to tell which of two successive sounds was the louder; and (6) to tell whether a given sound came from the right or the left of a given standard.

It will be observed that this involves the capacities most used by the blind as distinguished from the seeing—those which are generally assumed to be increased by use.

The result of these measurements may be generalized in the single statement that there is no significant difference in the sensitiveness of the blind and the seeing in the tactual, muscular, and auditory senses.

No seeing person can begin to guide himself by touch and hearing without training, but the point here made is that the training does not increase the sensitiveness of a sense organ. It merely puts this capacity to better use. These experiments also bring into relief the fact that all seeing persons do make constant use of touch, hearing, and the muscle sense.

To sum up, then: the senses of touch and hearing and other senses usually drawn upon by the blind do not have their psycho-physic capacity increased by the use they are put to by the blind. That capacity is set by heredity and very early development, and if any change takes place after infancy it is probably in the direction of deterioration.

H. V. W.

HEMERALOPIA AS WAR DISEASE.—MEYERHOF, M., Cairo, at present at Hannover (*Centralblatt f. prakt. Aug.*, 40, p. 2), gives an historical review on the occurrence of hemeralopia, observed by Detroye in soldiers of the expedition of Napoleon to Egypt, and by Robert during the siege of Malta, 1798-1800, due to lack of nutrition. M. mentions that also today the underfed Fellahs in the Delta land of Egypt, especially children, suffer from epidemic hemeralopia, and also from pellagra in consequence of poor nutrition with maize.

The two cases, which M. saw during the present war, were due to corneal opacities, respectively astigmatism. M. believes with

Best that the causes of hemeralopia, observed in the present war, are not uniform. C. Z.

ON THE POSSIBILITY OF ENABLING AMBLYOPIC PATIENTS (SOLDIERS) TO READ.—STOCK, W., Jena (*Klin. Mon. f. Aug.*, 55, p. 217), considers here only cases with central scotomas but normal peripheral visual field, or such in which central vision is damaged or destroyed in connection with sector-shaped defects of the visual field, and distinguishes two groups, viz., those with central vision below $1/4$ and others with central vision above $1/4$. For the first group the retinal image must be magnified from 1.3 to 2 times so that the patient can read. For distance telescopic spectacles on the principle of Galileo's telescope and prismatic telescopes are required. S. shows the advantages of each kind and how they must be constructed to be practically useful. For illustration several cases are reported. In one V $5/50$ was improved by a telescopic loupe to $5/10$, in another from $1/30$ to $5/12$ with magnifying telescopic spectacles. The telescopic spectacles with an additional lens can also be used for reading. C. Z.

ANATOMY.

ON THE TERMINATION OF THE EFFERENT NERVES IN PLAIN MUSCLE-CELLS AND ITS BEARING ON THE SYMPATHETIC (ACCESSORY) INNERVATION OF THE STRIATED MUSCLE FIBRE.—(Illustrated.)—PROF. J. BOEKE (*Koninklyke Akademie van Wetenschappen te Amsterdam*, 1915) refers to the investigations of recent years, which have demonstrated for a large number of different types of striated muscle-fibers of vertebrates, that the motor nerve-endings are hypolemmal in position; also that they pass through the sarcolemma, which becomes continuous with the neurilemma, penetrate into the sarcoplasm, which is considerably thickened at the site of the formation of the end-organs, and it was further assumed that here the neurofibrillar expansion of the motor nerve-ending is directly continuous with a reticulum in the sarcoplasm, the so-called "periterminal network."

Boeke examined a freshly enucleated normal human eye hardened in a large quantity of neutral formalin-solution of 12%. Parts of the corpus ciliare and iris were treated by the method of Bielschowski. The relations between the nervous elements and the muscle-cells of the C. cil. were studied. Two different systems of nervous terminations between the muscle cells were found. In the first

place a loose plexus (at places perhaps a network) with wide meshes of nervous non-medullated or partly medullated fibres, that end in distinct sheathed bulbous or coiled-up terminations. Since these nerve-fibers and their terminations lie in the connective-tissue around bundles of the plain muscle-cells and remain entirely independent of the muscle-cells, they must be regarded as the free nerve-endings of sensory nerves, already described by Agababow. In the second place we see a very fine plexus and network of very fine non-medullated nerve-fibres, with small meshes, lying between the muscle-cells. This plexus contains in the first place the network described by Agababow, consisting of fine varicose nerve-threads, running between the muscle-cells surrounding these cells, encircling them with smaller and longer meshes of extremely delicate fibrils and more or less thickened points of junction. At these points the neurofibrillar apparatus appears to be broken up into an extremely fine network: the terminal network of Agababow. But a close study reveals the fact that this network is not the terminal nervous apparatus. From the nerve-threads composing the meshes of this network, lying between the muscular elements and encircling them, are branched off at all points extremely delicate neurofibrillae, fine filaments having only a diameter of several millimicra. Only the threads that form a second network or plexus exhibit the ring-shaped varicosities, the end-rings and small terminal nets, which must be regarded as the real terminations of the nervous apparatus. These end-rings are found lying intraprotoplasmatically inside the muscle-cells, and the fine fibrillae, composing the second network, form a reticulum in the protoplasm of the muscle-cells, encircling the nucleus, running between the myofibrillae of the cell, and thus showing their intracellular position, finally giving off branches that are so exceedingly fine and form such small meshes that they cannot be distinguished from the protoplasmatic reticulum of the cytoplasm of the muscle-cells itself.

Thus the apparent controversy between the relations of the accessory nerve-terminations and the striated muscle-fibres on the one hand, of the sympathetic nerve-terminations and the smooth muscle-cells on the other hand, is seen to disappear. In the smooth muscle-cell we find the same identical relations of nerve-endings and sarcoplasm as in the striated muscle-fibres. E. E. B.

ON THE STRUCTURE AND THE INNERVATION OF THE MUSCULUS SPHINCTER PUPILLAE AND THE MUSCULUS CILIARIS OF THE BIRD'S EYE.—(Illustrated.)—BOEKE. PROF. J. (*Koninkl. Akad.*

van Wetensch. te Amsterdam, 1915), found the relations between the efferent nerve-endings and the muscle-cells of the pupillae sphincter in the iris of the human eye essentially the same as in the ciliary muscle. In connection with these observations it seemed to be of interest to study somewhat more closely the structure and innervation of the intrinsic muscles of the bird's eye.

The M. cil. and constr. iridis of the avian eye are composed of striated muscle-fibres; the Dilat. irid. does not show any vestige of cross-striation.

The muscle-fibres of iris and M. cil. do not possess the tough, thickened cell membrane commonly known as sarcolemma. Here the plasma and the myofibrilla contained in the sarcoplasma are surrounded by an extremely thin and delicate membrane, reinforced by the closely applied bodies of connective tissue cells, and often it is practically impossible to demonstrate the membranous covering of the fibres, which might be called a sarcolemma apart from this connective tissue. The muscle-fibres contain a very considerable amount of sarcoplasm and only a comparatively small number of contractile striated fibrillae. These fibrillae are usually gathered together into a number of column-like or plate-like bundles, which we may call sarcostyles (Schäfer). In thin muscle-fibres these fibril bundles are distributed rather regularly throughout the whole muscle-fibre. In the larger muscle-fibres these fibril bundles are arranged in flattened bundles, folded or curved round and lying in a large amount of sarcoplasm. The sarcoplasm between the folded and curved sarcostyles is in most cases of a very loose reticular slightly granular appearance. Outside the column of fibril bundles the sarcoplasm is generally of a more coarsely granular structure and surrounds the contractile elements on all sides, often in a thick layer. At intervals this layer of sarcoplasm lying outside the column of sarcostyles is so thick that it not only surrounds the bundle of sarcostyles at all sides, but is seen projecting beyond the line of the surface of the fibre, forming a sort of protuberance on the side of the fibre; this accumulation of sarcoplasm always contains several nuclei. In the iris of the birds the muscle-fibres are branched, interwoven, and anastomose through these side-branches, so that there is established a continuity of the fibres throughout the whole ring of the iris instead of a tissue containing only distinct separate fibres. The muscular system of the iris can be regarded in a certain sense as a syncytium, composed of elements, connected with each other, and in which the fibres of the circular system are in an organic connection with the radiating fibres of the iris muscula-

ture. Entirely independent of this system remains the membrane of Bruch, composed of fibres (or elongated cells), running only in a radially direction and remaining through life in close connection with the epithelium of the iris: the real dilator pupillae.

In the iris stroma nerve-fibres running between the muscular elements of the sphincter pupillae are found, which supply them with terminations. On the muscle-fibres both of M. cil. and sphincter pup. these efferent nerve-terminations are loose, provided with only a few branches and small endrings or delicate endnets. The motor nerve-fibre usually enters the muscle-fibre at one of the sarcoplasmic protuberances described above, and the nerve-endings are hypolemmal. The existence of a periterminal network in the sarcoplasm and the intimate connections between this periterminal network and the nerve-termination on one hand and the contractile fibrils on the other hand could be stated with accuracy. Beside these motor nerve-endings at the end of medullated nerve-fibres there exist in the sphincter pup. and M. cil. of the bird's eye just as in the skeletal muscles the very delicate, non-medullated nerve-fibres with their small, loosely arranged, delicate endings, entering the muscle-fibres independently of the motor terminations mentioned above, which could be traced to the sympathicus.

Ganglion cells in corpus cil. and iris were scarce. It therefore seems improbable that they should exist in the numbers required for the theory of Inglis Pollock. So from this point of view too renewed research is necessary.

E. E. B.

THE NERVE DISTRIBUTION OF IRIS AND CORPUS CILIARE IN MAMMALS (MAN) AND BIRDS.—BOEKE, PROF. J., demonstrates at the Dutch Anatomical-Day specimens (April 17, 1915) (reported in *Tydschr. v. Gen.*, November 27, 1915), and then speaks about the peculiarities of the nerve distribution in the muscular fibres in ciliary body and iris. The human ciliary body is an example of typical smooth muscular tissue subject to will. The fibres are intimately connected, often limit cannot be observed: they have a long spindle shape. Between the muscle fibres the nerve-fibres form a network with loose meshes. These send very fine nerve-fibres in to the cells, which form there an intracellular framework, which carries the final rings and nets, and which seems finely to adhere with a protoplasmatic reticulum. Boeke considers this equivalent with the periterminal net, which could be demonstrated in the sarcoplasm at the motoric endplates of the striped muscle fibres. It is peculiar that in the smooth muscle cells of the musc.

ciliaris hominis the endrings of the nerve fibres, which have often penetrated so deep in the cellular body, that they indent the nucleus, appear in two different forms, as small endrings and as fine end-nets.

Musc. ciliaris and sphincter pupillae of birds consist of striped muscle-fibres. These fibres are peculiarly built. The fibres of the sphincter pupillae (in chicken and pigeon eyes) are branched and are connected in the form of a net through striped junction-branches. The striping is less distinct as in the voluntary muscles and the fibres are very rich in sarcoplasm. In cross section only a few bundles of plates or rings of contractile fibrils are seen in the sarcoplasm-mass. These bundles or plates of fibrils are connected through loose meshes of sarcoplasm. In a number of spots in the course of the fibre the sarcoplasm forms thick prominent accumulations; it is there granular with a smaller or larger number of nuclei. Some of these sarcoplasm accumulations serve as sole-plate for the distribution of the end branch of the nerves. The final ramification of the nerve fibres in the muscles of the bird iris is characterized by its looseness. Long, thin branches originate in small number (often not more than two or three) at the end of the nerve fibre, and spread about the muscular fibres. The branches have here often a peculiar course around the sarcoplasm accumulation.

Thick myelin containing very thin naked nerve fibres are together in the nerve bundles. The myelinated fibres form the above described endplates, the naked fibres extremely fine endings and end-nets upon the muscular fibres, which look exactly alike as the accessory nervous endings described in the striped muscle fibres. The same could be demonstrated in the musc. ciliaris (gallus). It seems therefore that a double innervation exists also for the inner ocular muscles. It is important in connection with physiological experiments that this double innervation could be demonstrated for the circular and radial muscle fibres.

Boeke did not succeed in impregnating the nerve endings on the muscle cells of the membrane of Bruck (the true dilatator pupillae). He found ganglion cells (with peculiar shape) in the human ciliary body. The above described sarcoplasm accumulations of the muscle fibres in the bird iris seem often to have been mistaken for ganglion-cells.

In answer Boeke states that the bird iris rather possesses three muscular systems, the striped sphincter pupillae, the herewith connected striped radiarily arranged layer of dilator fibres in the pos-

terior half of the iris stroma, and behind this the unstriped membrane of Burch in contact with the epithelium. In the two striped layers B. found double innervation. These same three layers are found in man.

E. E. B.

THE SO-CALLED GLANDS OF TREACHER COLLINS IN THE PARS PLANA OF THE CORPUS CILIARE.—(Doctorate Thesis. Illustrated.) —RUTTERMAN, CORNELIUS, mentions the investigation of Collins as opposed by John Griffith, also the work of Mawas and Salzmann. In all, 80 eyes were examined histologically from the Amsterdam clinic, for the presence of the glands of Collins in the passage of the pars plicata in the non-plicata, and in the continuance of the pigment epithelium to the ora serrata. He did not include the pars plicata of the ciliary body. 23 or 28.2% showed distinct glands as described by Collins; 18 or 23.1% showed an indication of folding or doubling or irregular growths of the pigment epithelium at the spots indicated by Collins; in 39 or 48.7% the glands were absent and the pigment epithelium went without any irregularity from the pars plicata towards the ora serrata.

In the eyes in which the Collins glands were found diagnoses were as follows: Atrophia bulbi, Cyclitis, Glaucoma, Haematoma, N. Optica, Hyalitis, Papillitis, Ruptura sclera, Sarcoma chorioidea, Sarcoma limbi, Sympathetica ophthalmia, Trauma, Tuberculosis irides.

Depigmentation after the method of Gruenert was done in order to study the connection between the "glands" and the pigment layer.

The "glands" cannot be the result of lower intra-ocular pressure because in nine cases with atrophie bulbi they were absent in two and very indistinct in three; but they were very distinct in four out of fourteen glaucomatous cases. In one eye removed for sarcoma at the limbus, the inner structure was normal and the "glands" were present, as claimed by Collins.

That these glands have a secretory power was not confirmed by the study of these cases: they were very pronounced in three cases of atrophie bulbi in which all secretory processes had long since been destroyed; in the five cases of hyalitis which distinctly showed the glands, three were still in an inflammatory stage where stronger secretion would be expected, but the other two had passed the inflammatory stage and showed no symptoms of shrinking. No conclusion could be drawn as to sex or age.

The pigment epithelium layer consists of a row of cylindrical cells with oval or round nuclei, usually lying in the part of the cell turned towards Brück's membrane. The cells are separated from the pars ciliaris retinae by a finely notched border, the result of expansion of the cells towards the C. V. The "glands" stand upon this epithelial layer, consist mostly of from four to eight cells, are similar in form of cell and nucleus to this epithelium, and lie irregularly against each other without intervening space. At the site of these spots the epithelium is in no manner different from any other part. Usually the membrane of Brück passes over the extensions but sometimes they extend outside that membrane. The larger blood vessels usually lie outside that membrane but sometimes small capillaries are seen between the membrane and glands. These pigment knobs appear almost always at the same spot—i. e. directly behind the pars plicata and directly before the ora serrata so cannot be considered as a conglomerate cell mass. The pigment in the glands is identical with that of the one layer of pigment cells, which speaks against a secreting power. A lumen was not distinguished, nor was any interruption of the pigment epithelium layer or of the colorless layer of cells of the pars ciliaris retina found whereby the secretion could be transported to the C. V. cavity.

R. concludes that they are not true glands because they are absent in some animals with normal A. C. and C. V. fluids; they cannot be found in many human eyes; a lumen cannot be demonstrated. The most probable interpretation seems to be that of Salzmann—i. e. that they are simple cell masses along the edges and ridges of the lamina vitrea externa, accommodating, in form, to the network of this membrane, even if we have to consider the possibility that these structureless edges are cuticular products of the epithelium cells which surround them.

Further that "the pigment extensions, described by Collins, are not glands, but pigment knobs, which probably depend in locality and form, on the peculiar function of Brück's membrane, and the function of which does not differ from that of one layer pigment epithelium.

E. E. B.

ANOMALIES

CLINICAL AND ANATOMO-PATHOLOGICAL INVESTIGATIONS ON CONGENITAL PARTIAL ANIRIDIA.—BÖHM, K. (From the eye clinic of Prof. W. Uhthoff in the University of Breslau, *Klin. Mon. f. Aug.*, 55, p. 544). So far cases of partial congenital aniridia, ex-

cepting one case by van Duyse, have not been examined anatomically. As B. considers just such cases very valuable, being best adapted to furnish a clue, why the iris developed normally at one place and remained rudimentary at the other. He therefore gives the microscopical description of the left eyeball of a girl, aged 24, who had finally become blind in both eyes from glaucoma. The left eye was enucleated on account of distressing glaucomatous symptoms. It showed disturbances of the ectoderm and mesoderm. B. ascribed great importance to the anomalies found at the posterior surface of the cornea. From here lamellae extended in form of a processus into the anterior chamber towards the equator of the lens into the anterior limitant stratum of the vitreous, to which they were adherent. At this place the rudiment of the iris was smallest and became larger, where the corneal anomaly disappeared. B. thinks, that the corneal spurn and the strand connecting it with the vitreous originated in the mesodermal cells of the embryonic anterior portion of the vitreous. No muscles were found in the rudiment of the iris. There was also a slight aplasia of the ciliary processes, and the zonular fibers were lacking on the side of the iris rudiment. Pigment cells lay on the anterior surface of the lens and on the posterior surface at the equator. The ora serrata contained larger cavities, where the iris was preserved. Wherever the rudiment of the iris grew larger, the other disturbances of development declined. The clinical experience contradicts the view of Seefelder, that the seat of the anomaly in the first place must be sought in the retina: for literature contains cases of aniridia with good vision. The failure of sight is chiefly due to complications, viz. through the development of myopia with its deleterious changes and the additional glaucoma. C. Z.

AN ANOMALY IN THE STRUCTURE OF THE RETINA OF THE WHALE.—TEN DOESSCHATE, G. (*Tydschr. v. Gen.*, Sept. 25, 1915). mentions Pütter's description of a so-called new sense-organ in the lower part of the bulb 1.7 m. m. behind the iris in *Hyperoodon rostratus* (Zool. Jahrb. Bd. 1912). This sense-organ lies in front of a marked dilatation of the perichorioidal lymph-space.

The author examined an embryo of *Phocaena communis*, which was 9.2 c. m. long. The ocular measurements are: Axis 3.077 m. m., width 3.690 m. m., height 2.880 m. m. At the root of the iris in a certain number of coupes the nuclear elements of the retina bent backward, when the external nuclear layer seemed to split in two parts, one of which followed the posterior surface of the

iris, while the other part bent backward. In a number of coupes this "bending" is found only at the under side, while in another part it is found down as well as up. The fold is absent at the upperpart in some 40 coupes ($40 \times 30 \mu = 1.2$ m. m.). Reconstruction shows that the anomaly is absent at the under side of the bulb along a small distance of both sides of the vertical meridian, being present further around the entire cornea. This anomaly is developed in both eyes in about the same degree. It was not found in a younger embryo (4.8 c. m.). Again it was found in an embryo measuring 5.8 c. m. It was not found in eyes of embryos of *Balaenoptera rostr.* (10.5 c. m.) and *Lagenorhynchus albirostris*.
E. E. B.

TWO CASES OF ARTERIA HYALOIDEA PERSISTENS WITH A PECULIAR NARROWING OF THE VISUAL FIELDS.—WAARDENBURG, P. J. (*Tydschr. v. Gen.*, Nov. 27, 1915), was consulted by a 19 years old boy, who wished his left eye straightened. The color of the left iris is light blue with orange yellow pigment spots. V. O. S. $1/300$, with corr. $5/300$ (H. 5D. = Ash. 1D.). Strabismus divergens; iridodonesis, calcareous cataract, circumpapillary chorioideal atrophy, persistent cloquets canal, horizontal nystagmus.

O. D. has a dark blue iris with orange yellow pigment spots, slight nystagmoid movements. V. 6/8f., with corr. 6/6f. (H. 3.5D. = Ash. 0.5D.).

The nyst. motions in O. S. became stronger on looking upward, in O. D. on looking toward the left.

The iridodonesis depended on absence of the lens. After dilatation of the pupil some calcareous lens restes are seen toward the nasal side of the ciliary body, some 2.5 m. m. broad. The eye must have been myopic before the cataract formation. In a somewhat sagittal direction a strand goes from the disc toward the lateral under margin of the shape formless lens-mass. The strand originates with a broad base nearly from the entire disc-surface and looks grayish-white in the direct image. Around the origin the retinal vessels appear at the disc-circumference.

W. imagines that with the myopic distension of the left eye the mesodermic strand has pulled at the post. pole of the lens, which rent the capsule, producing a lenticonus post., the cause of cataract formation. Perhaps the cataract, as we have to deal with a young individual, has been largely resorbed and the shapeless white rest, still visible, consists of thickened capsule remnants with chalk deposit. After shrinking of the lens-mass iridodonesis has originated.

The temporal side of the retina was insensitive to light, the nasal side was sensitive with concentric narrowing, while the sides were separated by a nearly vertical line; it was not entirely certain, if the macula functionated. This strange fact of vertical hemianopsia was also found in the following case:

A lady, 48 years old, married, finds diminution of vision during the last year. O. D. has never been good. Externally nothing particular. V. O. S. 6/60, after 3 months 3/18 (in the macular region a hemorrhage); after corr. 5/10.

O. D. V.: 1/60f. A strand goes out from the center of the disc, white with direct ophthalmoscopy, goes forward and divides then in two branches at a distance of some 2 m. m. of the disc. The two branches are grayish, they end free in the vitreous body after division in a number of much finer threads, many of which are thickened at the end to knobs, so that the whole looks like a set of riding whips with knots at the ends of the strings. The strand does not make distinct free motions with the eye. No connection with the post. pole of the lens. It is not clear if vessels go from the disc in the strand. Besides the fundus is normal with the exception of the art. temp. inf. A white streak accompanies this vessel till the retinal periphery, broadest at the disc, becoming smaller toward the periphery. The streak divides with the vessel in two branches. It appears as if the vessels are lying on the white streak as they are uninterrupted. Most probably these streaks are congenital, as they accompany the vessels without the picture of perivasculitis. Also here we have to deal with the rests or consequences of an art. hyal. persistens. The nasal side of the retina does not perceive, the temporal side does with narrowing. A vertical line of division exists. The macula does not seem to perceive.

W. thinks that it is not so accidental that the art. hyal. pers. is connected with hemianopsia. He wishes for more reports to exclude chance. The question will have to be decided if the strand and the amblyopia are dependent on the same cause, or if the one is the cause of the other.

E. E. B.

BACTERIOLOGY

BACTERIOLOGICAL AND CLINICAL STUDIES OF AN EPIDEMIC OF KOCH-WEEKS BACILLUS CONJUNCTIVITIS ASSOCIATED WITH CELL INCLUSION CONJUNCTIVITIS.—NOGUCHI, HIDEYO, and COHEN, MARTIN, New York (*Arch. Ophthal.*, March, 1916, XLV, 155).

investigated the relationship between the Koch-Weeks bacillus and epithelial cell inclusions. Study of their cases was made during an epidemic of conjunctivitis which occurred among their cases of conjunctivitis associated with epithelial cell inclusions and included 17 cases in which there was epithelial cell inclusions at first, with subsequent Koch-Weeks infection; two cases of Koch-Weeks bacillus conjunctivitis, with subsequent appearance of inclusions; and six cases of epithelial cell inclusions alone.

The authors conclude as follows:

1. There are cases in which epithelial cell inclusions may alone be present in the conjunctival smears. In such cases no other pathogenic organisms, such as the Koch-Weeks bacillus or the pneumococcus, can be demonstrated in smears or cultures.

2. The conjunctiva can become simultaneously infected with the inclusion bodies and Koch-Weeks bacilli or other organisms.

3. In cases of acute or subacute conjunctival inflammations due to mixed infections the clinical features of each infection may be present. The course of the inflammation is, however, more prolonged.

4. Within recent years, the Koch-Weeks bacillus has only seldom been found in our routine examinations.

5. The epidemic studied was of a severe type.

6. Clinically it is practically impossible to distinguish pneumococcal conjunctivitis from the Koch-Weeks conjunctivitis. Bacteriological examination of smears and cultures is the only means by which the etiological diagnosis can be definitely established.

7. Conjunctivae of certain species of monkeys are susceptible to the von Prowazek inclusion bodies, but not to the haemoglobinophilic bacilli isolated from cases of epidemic conjunctivitis.

8. The injection of conjunctival scrapings containing the von Prowazek cell inclusions into the testicles of rabbits produces no cell inclusions in the latter, while the injection of a pure culture of the haemoglobinophilic bacilli causes an acute inflammation accompanied by numerous clumps of organisms, simulating the von Prowazek bodies at certain stages of their evolution.

9. There exists an apparent morphological similarity between the degenerated forms of this variety of the haemoglobinophilic bacilli and the cell inclusions, both in cultures and in experimental orchitis in the rabbit. But, as a rule, the elementary bodies of the latter are much smaller and more sharply defined than the smallest granules of the former, while the initial bodies are bigger, more

intensely stainable, and less definite in their contour than the haemoglobinophilic bacilli found in the infected conjunctivae.

W. R. M.

ON THE ACTION ON THE EYE, AND ON THE NATURE, OR BACTERIAL ANAPHYLATOXIN PREPARED FROM *BACILLUS PRODIGIOSUS*, AND EXPERIMENTS ON INFLAMMATORY SUBSTANCES CIRCULATING IN THE BLOOD OF RABBITS AFTER INTRODUCTION OF BACTERIA.—VON SZILY, A. (From the eye clinic of Prof. Th. Axenfeld in the University of Freiburg, *Klin. Mon. f. Aug.*, 55, p. 235), discusses, an introduction on bacterial anaphylatoxin in general, the phlogistic action of the conjunctival secretion containing anaphylatoxin, his experiments on the local effect of individual equal and homologous serum, or mixed with bacillus prodigiosus on the cornea of rabbits, anaphylactic experiments on the inflammatory substances circulating in the blood of rabbits after introduction of bacteria, and the relations of phlogistic bacterial extracts of prodigiosus to bacterial anaphylatoxin, prepared from bacillus prodigiosus, in the general anaphylaxis experiment, with conclusions.

C. Z.

CATARACT.

UNUSUAL CATARACT OPERATIONS.—FENTON, RALPH A., Portland, Ore. (*Northwest Medicine*, March, 1916), reports three cases of cataract operation in which unusual conditions were met. He concludes that: "No set of rules, names or formulae should take the place of actual physical familiarity with the feeling and the behavior of the ocular tissues concerned.

"The quickest and easiest method should, other things equal, be chosen always.

"All the instruments which may be necessary to a complete extraction should be on hand and ready whenever the globe is opened for lens work.

"Given fair projection of light, the presence of complications (such as synechiae, corneal scars, or even transferred uveitis) should not contraindicate operation, but rather spur us to devise methods for overcoming them.

"The patient should be hurried out of bed and upon his feet, rather than be kept ill in body and mind by recumbency.

"Above all let the operation be mastered: we must not let it master us.

"Better a little surgical common sense than much reference to the work of others in the literature."

G. W. S.

MANAGEMENT OF THE EYELIDS DURING THE CATARACT OPERATION.—VAIL, DERRICK T., Cincinnati (*Ann. Ophthal.*, January, 1916). The management of the eyelids during the cataract operation is of very great importance. Lt. Col. Henry Smith is responsible for having called attention so forcibly to it. He makes it one of the important features of his operation. He has a skilled assistant who, by the use of a hook and his fingers lifts the lids entirely away from the eyeball and makes it impossible for the patient to exert any pressure upon the globe during the delivery of the lens. When making the section and iridectomy both Vail and Smith use the Jullundar speculum. The speculum is then removed and Vail has his assistant support the lids by two lid retractors specially made for him by Mueller & Company. The smaller speculum is for the lower lids. Almost anyone can in a few moments be instructed in their use. M. B.

THE ARREST OF CATARACT AT AN EARLY STAGE.—JONES, E. L., Cumberland, Md. (*Ann. Ophthal.*, January, 1916). The common belief that nothing can be done except to wait for a cataract to ripen is not supported by the experience of the author and that of Lt. Col. Henry Smith. A letter from Smith is published in which he sets forth that the subconjunctival injection of 25 minims of cyanide in the strengths of 1/2000 in children, 1/4000 in adults and 1/6000 over 60 will clear the lenses in the first stage of cataract, but has little effect in the later stages. The first stage being that in which the lens is simply cloudy or contains dust-like opacities. The author uses eight grains dionin in one ounce of a 1 1000 solution cyanide of mercury and has the patient drop it in the eyes at bed time. As a result of this treatment the lens is sclerosed but remains clear. The author has seen sclerosis take place in the lenses of children injured by traumatism as evidenced by the eye becoming presbyopic. M. B.

SOME IMPRESSIONS OF EXPRESSION OF CATARACT WITH A SLIDING CONJUNCTIVAL FLAP.—GIFFORD, H., Omaha, Neb. (*Ann. Ophthal.*, January, 1916). Some fourteen years ago the author concluded to adopt the sliding conjunctival flap in all cases of extraction, because he felt that if it was an additional safeguard that all cases should receive the benefit of it. He soon gave it up because of infection of the wound in a few of his first cases. He attributed these infections to the suture holes in the conjunctiva being too near the corneal wound. In the fall of 1914 he took up

the operation again with a slight modification in the placing of the sutures. He has performed 68 extractions with the sliding flap and is so pleased with it that he proposes to continue it as a routine measure in all cases. His method of placing the sutures is as follows. The conjunctiva is loosened from the upper half of the cornea and is dissected back for one-half inch. A suture is then put in the conjunctiva at each side of the cornea at the junction of the upper and middle thirds of the corneal circumference. These sutures are now carried down and passed through a substantial fold of conjunctiva at the level of the lower border of the cornea and loosely tied with a double turn of the thread. With the threads drawn well to one side the section and other steps of the cataract operation are carried out. He emphasizes the importance of dissecting the conjunctiva close to the cornea, so that when the flap slides back it will adhere and cover any iris entanglements in the wound. The second bite of the needle in the conjunctiva should be taken a little below the margin of the cornea and a little outside the lateral margin. This is where his technic differs from that of the other men who have tried the sliding flap. This brings the stitch holes far away from the angles of the deeper wound. He finds that this operation demands more complete anesthesia. He uses a 10% solution of cocain four or five times and injects a single drop of this strength solution under the conjunctiva one-eighth inch from the lower margin of the cornea at each side. The principle disadvantage is the extra time required but he thinks this is unimportant. In summing up the advantages all the disadvantages of the regular conjunctival flap made at the time of the section are eliminated, the iris is easily replaced, infection of the wound is less likely to occur and in the event of loss of vitreous the corneal wound can be brought into perfect coaptation. He feels that if nothing else justifies the sliding flap, that the possibility of prolapse of vitreous alone fully warrants it as a routine measure in all cases. For dislocated lenses there is nothing like it.

M. B.

CATARACT IN EXPERIMENTAL THYROIDECTOMY. — EDMUNDS, WALTER, London (*Report of Ophth. Sect., Royal Soc. Med.*, February, 1916, *The Lancet*, February 12, 1916). The writer thought the lens opacity due to disease of the eye itself; in the dogs dealt with the pupil was active and there was perception of light. He thought the cataract was due to the general nutritional changes following the removal of the thyroid gland, and the fits seemed to be

due to that. Similar instances have been recorded in man. The cataractous changes which he found were not of the lamellar or any special type. When the parathyroids were also removed, the animal quickly sickened and died, the death being preceded by tremors.

C. H. M.

ACUTELY ORIGINATED AND CURED CATARACT WITH GLAUCOMA INFLAMMATORIUM.—KOSTER, W. GZ.N. (*Tydschr. v. Gen.*, Feb. 12, 1916).

A lady of about 60 years developed a very painful, very red right eye the day previous to consultation. On examination the redness is very pronounced, dilated veins in the conj. bulbi, pupil dilated, cornea pretty normal, no secretion of mucus; no epiphora, pain has already greatly subsided, the pupil looks gray. T. O. D.=+1; V.=1/50. A marked opacity of the lens in the pupil is seen with indirect light; with transmitted light a central cataract is seen, somewhat diffusely limited especially in the ant. cortex, along the periphery light reflex is seen. Fundus invisible. Field for hand movements normal. The left eye is normal with the exception of an opacity in the nasal lower part of the lens. Pat. thought to have seen up to yesterday very well with her right eye. Koster made the diagnosis of retrocedent acute inflammatory glaucoma in an eye with cataracta incipiens centralis.

After a week pat. returned with a white eye, without discomfort and the statement, that the eye had improved very much. Pupil had the same size as the left, round, reacting little to light. The pupil was still slightly more hazy than left, cornea entirely clear. Vision after correction nearly 6/6. With indirect and transmitted light not a vestige of the previous cataract visible; perhaps in the periphery a fine opacity. No changes in the fundus. Urine without sugar and albumen.

Koster never saw such a cure of a very marked lens-opacity. The diagnosis appeared to have to be: Glaucoma inflammatorium acutum with cataracta complicata acuta, where must be noted the remarkable fact, that that cataract had disappeared after a week.

The nature of the lens opacity can only be surmised: most probably extravasation of fluid between the lens fibers. On returning to the normal tension in the eye a short space of time exists, when fluid from the post. part of the eye will escape into the ant. part. Although no higher pressure appears as in the corp. vitr. as in the A. C. it can be understood, that with the slight motion of the lens forward, as a result of stronger tension of the zonula with the

consequent slight deformation, an extravasation of fluid between the fibers of some parts of the lens can appear. E. E. B.

CHORIOID

THE CHORIOIDAL TUBERCLE IN TUBERCULOUS MENINGITIS.—BREDECK, J. F., St. Louis, Mo. (*Amer. Journ. Oph.*, January, 1916).

There is much difference of opinion as to the frequency of chorioidal tubercles in tuberculous meningitis and this led the writer to consult the literature for statistics. He reviews some of the text-books and found that the pediatricists furnished the most valuable as well as the most conflicting literature; satisfactory conclusions could not be drawn from many of such reports since it was evident that the search for tubercles had not been very systematic; this was unfortunate since the pediatricists see most cases, about 60 per cent., of tuberculous meningitis occurring before the fifteenth year. The text-books on neurology were equally unsatisfactory, some not mentioning the condition at all, others considering it rare and another group holding that it is not infrequent. Ophthalmological text-books also disagreed on this subject. The text-books in medicine are of the opinion that chorioidal tubercles are uncommon, but should be looked for in all cases.

Sifting the evidence presented by reports in which careful examinations of the fundus had been made, he collected a total of 226 in which 33 showed tubercles in the chorioid, or 14.6 per cent. This agrees approximately with an average of 19 per cent. arrived at by Uhthoff. "As medical men we should be inclined to take the figures of Koch and Koplik as our standards because the tubercles were found in routine examinations, as should be done on every well organized ward. If daily examinations are made and, if possible, several a day, we should find tubercles in fifteen to twenty per cent. of our cases." He gives the following table:

Name.	Cases of Meningitis.	Cases with Tubercles.	Per- centage.
Koch	60	8	13.33
Koplik	46	9	19.5
Gruening	40	2	5.0
Heinzel	41	0	00.00
Garlick	26	1	3.84
Marple	13	13	100.0

Total 226 33

Average 14.6 + per cent.

This interesting paper terminates with the following conclusions:

1. Chorioidal tubercles are more frequent than the ordinary reports of cases of tuberculous meningitis would lead us to believe.
2. Complete autopsy reports including particularly reports of the eyes have been neglected in tuberculous meningitis.
3. In reporting the frequency of chorioidal tubercles in tuberculous meningitis cases it is necessary to state the number of examinations made with the ophthalmoscope before drawing conclusions.
4. Systematic, frequent and accurate routine ophthalmoscopic examinations are neglected in cases of tuberculous meningitis.
5. Recording in histories every ophthalmoscopic examination is of the greatest value, even though examination is negative.
6. Lumbar puncture has led many to neglect ophthalmoscopic examinations.
7. Daily ophthalmoscopic examinations by members of the ophthalmoscopic department in addition to daily examinations by ward doctors is necessary.
8. Many of our text-books on medicine, pediatrics, neurology, and ophthalmology give either imperfect, erroneous or, sometimes, no idea of the frequency of chorioidal tubercles.
9. Chorioidal tubercles should be found in fifteen to twenty per cent. of all cases of tuberculous meningitis.

C. H. M.

GUMMA OF THE CHORIOID.—HANSEN, R., Hamburg (*Klin. Mon. f. Aug.*, 56, p. 66). A man, aged 17, complained of a visual disturbance of his left eye. On admission, four weeks later, V. was reduced to counting fingers at 1 m., and a large central scotoma was found. At and below the macula was a greyish white focus of the size of the disc, bordered by a darker marginal zone. Fine retinal vessels coursed over it. The focus could be trans-illuminated with Hertzell's lamp. A small hemorrhage was seen near its temporal side. Wassermann positive, tuberculin reaction negative. Energetic antisyphilitic treatment with mercury, iodine and several injections of salvarsan were of no avail. Small hemorrhages and exudations, generally close to the retinal vessels, occurred periodically, the focus grew to twice its original size and its prominence increased to about 3 D. Abderhalden's serological test for sarcoma once was positive, once doubtful, radiations with Roentgen rays without influence. V. rose in the first few weeks to 4/18, but then again declined considerably. As the transilluminability also declined, a possible malign tumor was assumed and the eye was enucleated, the patient wishing to be relieved of distressing photopsias.

The microscopical examination revealed an inflammatory granulation tumor, in its center converted into sclerotic tissue, with

characteristic syphilitic changes of the blood vessels, i. e., undoubtedly a gumma of the chorioid. The occurrence of hemorrhages, due to the syphilitic changes of the vessels, had a certain differential diagnostic value in comparison to tubercle or sarcoma. The extraordinarily slow course and the lacking of inflammatory phenomena, especially the intactness of the vitreous, were peculiar.

C. Z.

CONJUNCTIVA

A METHOD OF TREATMENT FOR CONJUNCTIVITIS.—JEFFERSON, FREDERICK, Belfast, and ARMSTRONG, W. E. M., Dublin (*Brit. Med. Journ.*, Mar. 4, 1916). The necessity for a form of treatment which will be effective and rapid and capable of being applied to large numbers of men in the region of the firing line is pointed out: Some of the cases of conjunctivitis found here, are traumatic, but most are simple bacterial infections. Vaccine therapy would hardly be practicable under war conditions; any cases, however, in which styes are present as a complication should be treated with staphylococcus vaccine.

The writers give their experiences with eusol solution in the treatment of conjunctivitis having selected this agent because it is a powerful antiseptic, non-irritating, and has given good results in the field of general surgery, though it has not yet been used in infections of the eye. A solution about five times more dilute than that used for wounds gave the best results. Every second case of conjunctivitis was treated by irrigating the conjunctival sac freely three times a day with eusol; the other cases were treated with boric acid and zinc sulphate solution, as being probably the commonest of routine methods.

One hundred cases were treated in this comparative manner; 50 treated with eusol took an aggregate time of 303 days to cure or an average of 6 days; 50 treated with boric acid and zinc took 448 days or an average of 9 days; the employment of eusol therefore resulted in the saving of many days in the treatment. Furthermore, in six cases this agent succeeded in effecting a rapid cure of the disease where boric acid and zinc had proved unsatisfactory.

C. H. M.

PURPULENT CONJUNCTIVITIS IN INFANTS UNDER TWO MONTHS OF AGE.—WILLIAMS, ANNA W., and ROSENBERG, CAROLYN, New York (*Arch. Ophth.*, March, 1916, XLV, 109), report the results

of investigations undertaken by the Bureau of Laboratories of the N. Y. City Health Department in order to determine the present incidence, causes, and results of purulent conjunctivitis in infants under two months of age. Examinations were made of the eyes of 1,000 consecutive births, with the following results:

1. In a thousand consecutive births only 0.8% had purulent conjunctivitis.

2. In ten cases out of forty-seven cultured cases or in 21.2% only staphylococcus or staphylococcus and the xerosis bacillus were found, but not in large enough numbers to be considered a cause.

3. In twelve of these cultured cases, or in 25.5%, the gonococcus was found. In nine of these twelve cases, or in 19.1% only, of all the cases, was the gonococcus found without the presence of either the streptococcus-pneumococcus group or the influenza group of organisms. In three of these twelve cases, or in 6.3% of all the cases, the gonococcus was associated with either or both the streptococcus-pneumococcus and the influenza groups.

4. In twenty-two out of forty-seven cultured cases, or in 46.3% of all the cases, was the streptococcus-pneumococcus group of organisms found independent of the presence of the gonococcus and the influenza bacillus. It was thus found to be apparently about twice as often a cause of purulent conjunctivitis as the gonococcus.

5. In twelve cases, or in 25.5% (the same number of times as gonorrheal infection), was the influenza bacillus group found as the apparent exciting cause.

6. A history of 77% of cases positively receiving prophylactic treatment, and of a probably greater percentage having received it, suggests the advisability of treatment on the second day with AgNO_3 solution.

7. In only three cases was the cornea involved. The fact that these three cases were gonorrheal infections confirm the opinion that cases of purulent conjunctivitis which are infected with this organism are liable to be more severe in infants than those due to other infections.

8. Purulent conjunctivitis in infants is due, in one-third of the cases at least, to organisms other than the gonococcus.

9. The fact that purulent conjunctivitis or ophthalmia neonatorum does not always mean an infection with the gonococcus should make physicians more ready to report such cases to the Health Department.

W. R. M.

CORNEA

ROSACEA KERATITIS AND CERTAIN OTHER FORMS OF MARGINAL KERATITIS, NEUROPATHIC IN ORIGIN. TREATMENT BY PERICORNEAL NEUROTOMY.—VERHOEFF, F. H., Boston (*Arch. Ophthalm.*, March, 1916, XLV, 148), refers to peripheral corneal lesions accompanying herpes facialis, and which are neuropathic in origin. They are located about $1\frac{1}{2}$ mm. from the limbus and the author believes that they occur at the terminations of the conjunctival nerves in the cornea, and that they are manifestations of the general tendency of herpetic lesions to occur at the periphery of the area of nerve distribution. The author has shown that, histologically, the lesions of superficial punctate keratitis consist of localized infiltrates of necrotic pus-cells situated immediately beneath Bowman's membrane. His method of treatment is to do a partial peritomy, thus preventing abnormal impulses from reaching that portion of the cornea. Healing promptly occurred in 15 consecutive cases operated. In 12 of the cases, the corneal lesions failed to stain with fluorescein at the end of 48 hours and in the remaining cases they could be stained slightly for a day or two longer.

The author describes his method of operating. W. R. M.

SUPERFICIAL LINEAR KERATITIS.—SPICER, HOLMES, London, and GREEVES, AFFLECK, London (*Report of Ophth. Sect., Royal Soc., Med.*, Feb., '16, *The Lancet*, Feb. 12, 1916). The condition was one in which there were superficial ridges of epithelium raised above the level of the cornea, mostly running in vertical lines, grey and tapering, and having along their course bulging node-like appearance. They had tapering ends and did not extend quite to the limbus. They not uncommonly showed punctate staining, but there was no iritis. The tension of the eyeball was nearly always minus, and during such times the vision was definitely impaired, though it recovered when the normal tension was re-established. It differed from dendritic ulcer (which it appeared to simulate), especially in the reduced tension. No measures which they had employed prevented recurrences. C. H. M.

FURTHER CLINICAL AND ANATOMICAL CONTRIBUTIONS TO THE DEGENERATIVE DISEASES OF THE CORNEA.—UHTHOFF, W., Breslau (*Klin. Mon. f. Aug.*, 55, p. 290), gives the clinical histories and anatomical descriptions of a case of nodular degeneration of the cornea (Groenouw), and a rare case of grey spotted (cone-shaped) degeneration of both corneae. C. Z.

CONTRIBUTIONS TO THE PATHOLOGICAL ANATOMY AND OPERATIVE THERAPY OF CONGENITAL HYDROPHTHALMUS.—BÖHM, K. (From the eye clinic of Prof. W. Uthoff in the University of Breslau *Klin. Mon. f. Aug.*, 55, p. 556), describes the microscopical changes of 4 hydrophthalmic eye balls on which iridectomy had been performed, but which had to be enucleated later on. The common changes of all were: absence of the canal of Schlemm, various degenerative phenomena of the cornea more on the order of hyaline degeneration, not of keratitis bullosa. Bowman's membrane showed defects that contained connective tissue, abounding in spindle cells, which in literature have been taken for ruptures, although they have nothing characteristic of them, but there were ruptures in Descemet's membrane. The lens was cataractous, the anterior ciliary vessels ectatic, retina and chorioid atrophic; colloid changes of the chorioid, pathological excavation of the optic disc.

The failure of iridectomy was chiefly due to the absence of the canal of Schlemm. B. mentions 2 cases in which iridectomy was followed by incarceration of the iris and subsequent cystic cicatrization, and in which vision remained good. At the clinic generally anterior sclerotomy is performed in hydrophththalmus, as it is less dangerous. In most cases, however, it must be repeated. C. Z.

ON PARENCHYMATOUS KERATITIS IN THE RED DEER.—SÖNTAG, J. (From the eye clinic of Prof. A. Peters in the University of Rostock, *Klin. Mon. f. Aug.*, 55, p. 571). As, aside of lues and tuberculosis, the etiology of parenchymatous keratitis is still uncertain, the observations in animals, which are immune against syphilis, may be of assistance. Hence S. gives a review of the extant publications, and reports the histological conditions found in the eyes of a red deer, affected with primary parenchymatous keratitis, i. e., independent of an affection of the sclera or ciliary body. It showed no analogy with the processes observed in dogs and cows, called epizootic or distemper, nor with the infectious agalactia of goats, but coincided with the primary parenchymatous keratitis, observed by Königshöfer in an axis deer and by Kako in a goat, due to a general disturbance of nutrition which hardly was caused by an infectious disease but may have been of toxic or alimentary nature. C. Z.

GENERAL DISEASES AND THE EYE

NERVOUS AND OTHER MEDICAL DISORDERS AS SEEN AT AN EYE HOSPITAL (*The Harveian Lecture*).—TAYLOR, JAMES. London (*The Lancet*, March 25, 1916). The author is impressed by the large number of patients who seek advice at such a hospital as Moorfields on account of eye troubles which are indications of serious general conditions. He gives a classified review of the cases seen by him at Moorfields during the last five years. *Optic atrophy* furnished by far the largest number of cases, 233 in all. In a great majority of these cases the atrophy was found to be associated with other conditions. In over 200 of these there were definite signs of tabes or general paralysis of the insane; and in only two was ataxy complained of, and in one only was it very marked. Other conditions which he found responsible for atrophy were retrobulbar neuritis, lesions of the optic chiasm, toxemia from tobacco and alcohol, and Leber's disease (family optic atrophy).

Defects in ocular movements were observed in 52 cases, and in by far the largest number the third nerve was affected. The author made the interesting observation that the branch serving the pupil is that which escapes most frequently. The levator almost always suffers, so that ptosis is nearly always present. These muscular paralyses are most often associated with syphilis, but occasionally with migraine ophthalmoplegique, alcoholic poisoning, Graves' disease, myasthenia gravis and intracranial tumor.

In *myasthenia gravis* variability in the muscular weakness is especially characteristic. A patient may have, when first seen, double ptosis usually more marked on one side, and almost complete paralysis of all ocular movements. A few hours later the same patient may have both eyes well open and the impairment of ocular movement may be scarcely discernible. We are still in the dark in regard to the pathology of this disease. The author gives an illustration of a very much enlarged thymus which was found in a fatal case of myasthenia.

The *paralysis in intracranial tumor* cases may be either direct or indirect, that is, the ocular nerves or their nuclei may be directly involved in the tumor or directly pressed upon. In such cases the defects in ocular movements are frequently valuable indications of the site of the tumor. Or the affection of the ocular movements may be indirect, that is, the result of general intracranial pressure. And in such cases the sixth nerves are most often impaired, the result doubtless of the fact that such nerves are very fine and have a long and exposed course.

Sixty-two cases of *albuminuric and glycosuric retinitis* were studied. Of these 47 were albuminuric and 15 diabetic. The author is impressed by the fact that in some cases it is exceedingly difficult, so far as the condition of the optic nerve and retina is concerned, to distinguish between the neuro-retinitis and intracranial tumor—especially cerebellar—and albuminuric retinitis. He thinks that there is no doubt that comparatively small quantities of alcohol and tobacco are effective in evoking the signs of toxic amblyopia if sugar is present in the urine. He leans to the opinion that the outlook in regard to the duration of life is better in glycosuria with retinal involvement than in albuminuric retinitis.

There were 31 cases of *Graves' disease*; four were men. Of the 31 cases 4 were under 20, 9 between 20 and 30, 15 between 30 and 40, 1 between 40 and 50 and 2 (both were men) between 60 and 70. The author thinks that diplopia is more frequent in Graves' disease than is generally recognized.

Hemiopia was found in 22 cases. In 13 the defect was left-sided, and in 9 right-sided. In 6 cases there was either valvular heart disease or hypertrophied heart with high arterial tension; in 3 syphilitic vascular disease, while in 13 of this number, or roughly 52 per cent, there was nothing in the heart vessels or kidneys which suggested a cause for the hemiopia.

Twenty-six cases of *retinal embolism and thrombosis* were noted, and in 5 of these cases there was reason to presume that the condition was embolic. Of the others, the blocking was in an arterial branch in 7, in a venous tributary in 13; and in all of these cases except one there was evidence of considerable cardiac hypertrophy, with increased tension, and often there was albuminuria.

Optic neuritis was found in 38 cases. Intracranial growths were responsible for most of these, but the author recites cases apparently due to measles and chicken-pox. In conclusion the author urges the importance not only of highly specialized training in ophthalmology, but also of a broad general basis from which to work. He also urges the necessity for medical men, other than ophthalmologists, to recognize ocular and visual signs as indications of many different kinds of medical diseases J. M. W.

THE OCULAR SYMPTOMS OF MULTIPLE SCLEROSIS WITH REPORT OF A CASE.—NAGLE, F. O., Philadelphia (*Jour. Ophthal. Otol. and Laryngol.*, Feb. 1916). The author is a neurologist and calls our attention to the importance of the ocular symptoms in Multiple Sclerosis. Nystagmus is seldom absent and is responsible to a

localized sclerotic patch in the brain or medulla. Motility of the object fixed not uncommonly present. Paralysis of the eye-muscles is not rare, especially paralysis of the individual branches of the same nerve, and is of transient duration. Pupillary changes are rare. The optic nerves are more often affected than in other diseases of the nervous system, except cerebral tumor. The clinical features are those essentially of a retrobulbar neuritis with a central scotoma or without contraction of the field. An acute retrobulbar neuritis in the young points to a great likelihood of an oncoming multiple sclerosis.

The disease is more frequent in women and usually attacks people between 15 and 30 years of age. The duration is from several days to four weeks. The vision returns as suddenly as it left. The optic nerve is involved in about one-half of the cases. Pallor, atrophy, neuritis being the most common and choked disc rare. Visual disturbances may occur without any pathological change being present at the disc. Atrophy may be present in one nerve with neuritis in the other. Uhthoff's symptom is that loss of visual acuity follows general fatigue of the body. Total permanent blindness seldom occurs. The visual disturbance at first is that of a central scotoma; in other cases a peripheral visual field-contraction. The pathology is that of a sector degeneration. In perfectly normal parts of the optic nerve there may be found sclerotic patches in which the medullary nerve sheaths have disappeared. The axis cylinders remain intact.

M. B.

A CASE OF MOUTH- AND FOOT-DISEASE WITH OCULAR SYMPTOMS.—FABER, JR., L. A. (*Tydschr. v. Gen.*, Sept. 25, 1915), reports the following case in the hope of elucidation, as he did not come across such a combination in the literature. Writer was consulted on November 4th, 1914, by a 26 years old tinsmith, whose vision had diminished the day previous. He sees the surroundings as in twilight dark. V. O. D. 1/100. V. O. S. 1/60, no improvement with glasses. Conj. bulbi injected; media and fundi without changes; centrally a positive scotoma. Next day no changes; in consultation with an ophthalmologist, he mentions only that some retinal vessels are slightly dilated and tortuous. That evening patient has chills and temperature 38.5°. On November 6 no fever; mouth is painful, blebs appear at the innerside of the cheeks and entire lower lip; palms of hands and soles of feet itch with a feeling as if the folds would burst. On November 7 mouth is more painful, more swelling of the mucous membrane; some blebs open,

contain purulent fluid; some small blebs at the feet. Conjunctival inflammation stronger. November 9, vision the same. At the soles many small blebs, suggest variloid with seropurulent fluid. As far as could be followed the blebs begin as anaemic spots, surrounded by a red ring, which remains pretty well defined even after the bleb formation. Some superficial ulcerations, chiefly on the collum and corona of the glans penis; on the scrotum some blebs, which open.

This peculiar combination of symptoms of mouth and extremities suggest mouth-and foot-sore. In the neighborhood some cases have been diagnosed among the cattle. Patient never drinks un-boiled milk, but repairs milk tins. On November 15 patient is sent to Straub's clinic, where he remained until November 27. The diagnosis was agreed to. Patient went through an iritis with synechiae. On discharge $V.OO=1/3$. Corneae were somewhat edematous, at the post. surface numerous on spots Descemet. A few embolic foci in the right fundus. On December 1, $V.=1/2$: still conjunctival injection on spots Descemet and some vitreous opacities. $V.$ is on January 1, 1915, nearly normal. Patient can do his work, only complains of nyctalopia. In twilight he sees a great deal less than before.

Although the localization of the blebs is not exactly typical, Faber considers the diagnosis mouth-and foot-sore justified and wishes to correlate the ocular deviations and the changes on the extremities, mouth and genitalia under one clinical picture.

E. E. B.

CASE OF HAEMATOMA DURAE MATRIS, RIGHT FRONTAL REGION. —VAN DE GRAAF, ANNIE, publishes from the wards of Winkler a case of Haematoma Durae Matris, which showed some features of interest to ophthalmologists (*Tydschr. v. Gen.*, Oct. 16, 1915). The 36 years old patient is admitted in March, 1915. As a child she had an encephalitis, of which she recovered. From her nineteenth year she suffered with "absences." In May, 1914, she accidentally fell downstairs; she was not senseless, hurt her hip and had to stay three months in bed. Fourteen days after the fall she got visual hallucinations, without having shown psychically anything wrong beforehand. These disappeared without leaving any mark after some weeks. She got worse again in March, 1915, with psychic disturbances, for which she was admitted.

On April 11th she had twelve convulsions within 24 hours without any prodromi. During an attack she is unconscious, the pupils

do not react, she has incontinentia and positive Babinski. On May 2d again fifteen convulsions in 24 hours. Hereafter she becomes psychically much clearer than before. Then again without provocation, on May 31st, a succession of convulsions (43 in 24 hours). In the interim she does not react to address or pinpricks and the temperature increases to 38.1° C.

The observed convulsions have the same type; they start with an inhalation cramp and a tonic contraction for some seconds of the right facial nerve with hypotony of the left. Eyes and head turn to the left. The left arm came in flexor-contraction with clonic twitchings, followed by tonic and clonic contractions of left leg, right leg and right arm. On the moment on which the right arm is lifted in tonic spasm the conjugated deviation changed to the right and the head was turned. The pupils which were wide at the beginning of the attack, became meanwhile narrow, continuing without reaction.

Ophthalmoscopically between the attacks nothing particular could be noticed. Suddenly the arteries became extremely narrow, while the veins did not show any distinct change, and a moment later an attack happened. If directly after it one ophthalmoscoped, one SAW the vessels fill up until the normal condition was restored. This phenomenon was observed by different observers.

Between the attacks the pupils were in continuous motion, so that, with a continuous hippus, also a slower progressing dilation and narrowing of the pupil was present. The type of respiration changed constantly, while a connection seemed to exist between this respiration and the pupillary motions; with the narrowing of the pupil in hippus a deepening and acceleration of the respiration combined. The pupil remained some seconds narrow and the dilation was started with the change of respiration. No Cheyne-Stokes-respiration, neither respiratory pause was present. The diagnosis was Haematoma in the right frontal region, which was corroborated by the operation. The writer points to the practical value of the Roentgen-photo in cases of haematoma duræ matris. E. E. B.

GLAUCOMA

THE INDICATIONS FOR OPERATION IN GLAUCOMA.—POSEY, WILLIAM CAMPBELL, Phila., Pa. (*Therap. Gazette*, Feb. 15, 1916). The writer gives a brief summary of the indications for operation in primary glaucoma as follows: 1. In all cases of acute and subacute glaucoma and in all chronic cases on the manifestation of any inflammatory glaucomatous symptoms. 2. In all cases of chronic

glaucoma in which there is doubt of the patient's co-operation in the persistence in the myotic treatment through the remainder of life; this includes practically all hospital cases and such private cases as may be of a weak and vacillating disposition. 3. In all cases of chronic glaucoma which reside at such a distance from proper ophthalmic care that they are unable to report at sufficiently frequent intervals for the supervision necessary in the proper and safe carrying out of the myotic treatment, or for operation in the event that inflammatory symptoms arise. 4. In chronic cases under fifty-five years of age, when the field of vision and central vision are good, an operation upon the more affected eyes is advised, myotics being employed in both the operated and unoperated eye for the remainder of life. Operation upon the second eye should follow, if subsequent observation shows that vision is maintained better in the operated than in the non-operated eye. 5. In all cases of chronic glaucoma, without regard to age or the development of the disease, in which myotics have been given a faithful trial for at least six weeks or two months, as evidenced by the constant maintenance of pupillary contraction to almost pin-point size, and in which vision and the field of vision show progressive deterioration.

Cyclo-dialysis is preferred in all cases in which operation is demanded if there be a hemorrhagic tendency or the field of vision is very much reduced. Iridectomy is reserved for all other cases. The trephining operation has been relinquished, as it appears to be a more dangerous procedure than iridectomy, on account of the opacification of the lens which follows in not a few cases, either immediately or remotely after the operation; furthermore, even in cases in which these complications do not arise, it has not been proven that the visual results after trephining are any better than those obtained by a properly executed iridectomy.

In all cases not included under the five headings given above, myotics should be employed with great zealousness and persistence four times during the day. The maintenance of vision by this method does not warrant the gloomy prognosis which is so often rendered in cases of chronic glaucoma.

C. H. M.

TREPHINING VERSUS IRIDECTOMY IN GLAUCOMA.—WOODRUFF, H. W., Joliet, Ill. (*Ann. Ophthalm.*, January, 1916). Iridectomy, an operation for glaucoma of fifty-three years standing, still remains at the head of the list as the most successful. The operation of trephining is an operation of value, but should not be performed until iridectomy has failed.

M. B.

REPORT ON A GOLD (MULE-SHOE) DRAIN FOR CHRONIC GLAUCOMA—A NEW METHOD TO AVOID USUALLY EMPLOYED FLAP.—PRINCE, A. E., Springfield, Ill. (*Ann. Ophthalm.*, January, 1916). A gold ring is made out of gold wire, No. 30, B. & S. gauge, equaling ten one-thousandths of an inch. The diameter of the ring is $2\frac{1}{2}$ mm. Extending from it is a toe $1\frac{1}{2}$ mm. long, bent at a right angle. This toe is dropped into the trephining opening, is self retaining and prevents closure of the trephine opening. The conjunctival flap is made through a circular incision placed 8 mm. above and parallel to the cornea. A specially made retractor is used to pull the conjunctival flap down over the cornea while a keratome with a rounded point is used to underent the cornea for the introduction of the trephine at the limbus. After the mule-shoe drain is placed in position, the conjunctival flap is replaced and the conjunctival wound is closed by an overcast suture, requiring no knots.

The author's experience has been that this foreign body produces no irritation and assures permanent drainage from the anterior chamber under the conjunctiva. M. B.

ETHMOID DISEASE AND ITS RELATION TO GLAUCOMA.—DOWLING, J. IVIMEY, Albany, N. Y. (*Jour. Ophthalm. Otol. and Laryngol.*, Feb., 1916). He says: "Continued study and more recent clinical observations have led me to the belief that the intraocular changes and increased tension, in at least a fair proportion of cases, are secondary to extra-ocular pressure, and that the colloidal changes are induced by circulating toxins originating in the infected ethmoid cells or other accessory sinuses." Several cases are reported to substantiate his claims. M. B.

HISTORICAL

TO THE HISTORY OF THE LUMINOUS APPEARANCE OF THE EYE.—HIRSCHBERG, J., Berlin (*Centralblatt f. prakt. Aug.*, 39, p. 81). quotes from the first work on the luminous appearance of the human eye from the year 1823 by J. E. Purkinje. Purkinje observed this while wearing concave glasses, similarly as 23 years later von Erlach. Purkinje, however, went farther and saw the background of an artificial eye, which he had constructed, and recommended the method for diagnostic purposes. II. says a generation had to pass before the numerous and useful recommendations of P.'s

“commentatio” were adopted by practice. Here the fate of the great Purkinje resembled that of the still greater Thomas Young.
C. Z.

TO THE HISTORY AND CRITICS OF THE NEWER METHODS OF TREATMENT OF SUPPURATION OF THE TEAR-SAC.—SCHUSTER, K. (From the eye clinic of Prof. A. Peters in the University of Rostock. *Klin. Mon. f. Aug.*, 55, p. 596), shows in an historical review that dacryocystitis may be cured in different ways, but that each of the larger number of modifications has its failures. He describes the method of Prof. Peters, which consists in slitting of the lower canaliculus and the cutting of the strictures by constant turning of the blunt-pointed knife, introduced into the nasolacrimal canal. It effected a cure in 77%. The failures were perhaps due to affections of the accessory cavities of the nose which, according to the investigations of Rhese and Brunslow, were found by examination with Roentgen rays in about 37% of uncomplicated suppurations of the lacrimal sac. If this should prove true, one has in future to give preference to the intranasal treatment of the sinuses before resorting to extirpation of the lacrimal sac.
C. Z.

INJURIES

SOME RARE OPHTHALMIC “WAR” CASES.—CLARK, ERNEST, London (*Med. Press*, Dec. 29, 1915). The writer gives a short account of three examples of unusual eye injuries received in the war. The first was received when a nickel bullet hit a soldier’s spade and was reduced to hundreds of fragments: some of these injured the eye; examination showed a small corneal opacity where one of the fragments, larger than the rest, had gone through the cornea and entered the lens where it could be seen superficially embedded: the whole cornea was found riddled with extremely fine dust-like particles of nickel; V.=6/9 and since there was no reaction it was considered wise to do nothing in the way of treatment.

The second injury was received when a bomb exploded to one side of a private knocking him unconscious. Four days later examination in the hospital showed that the eye had been evulsed and not a vestige of this organ could be found: it was impossible to determine whether this was due to the intense pressure which always accompanies a high explosive or the result of the vacuum that invariably follows. In support of the latter theory, attention may be drawn to the fact that during the recent bomb explosions in

London, in many buildings windows were "blown out," and not "blown in." In the big hall at St. Bartholomew's Hospital many of the large stained glass windows (all the windows were shut in the Hall) were blown *out* by the bomb that fell in St. Bartholomew's Close.

The third history relates to a concussion blow upon the closed eye from a bomb; the lid was swollen and chemosed but there was no skin wound; the anterior chamber was filled with blood and the patient could not distinguish hand movements; T.—2. The blood gradually cleared and a subacute iridocyclitis ensued. Two months later the eye was still sightless and painful, anterior chamber deep, iris atrophied and bombé with posterior synechiæ. Examination of the eye after enucleation showed a complete detachment of the retina forming a thick cord passing from disc to lens.

C. H. M.

THE TREATMENT OF "CONCUSSION BLINDNESS." — HERTZ, ARTHUR F., and ORMOND, ARTHUR W., London (*The Lancet*, Jan. 1, 1916). One of the principal ocular features of the present war is the number of cases of functional blindness due to the violent explosions caused by high explosive shells, bombs, hand-grenades, etc. These cases may or may not have sustained definite organic injuries, but the clinical symptoms characterising their functional nature are very clearly marked. Usually the patient has been rendered unconscious by an explosion in his close vicinity, and on regaining consciousness he finds that he is unable to see. When examined he presents the following symptoms: The eyes are kept closed and on attempting to open the lids, the patient resists forcibly by means of his orbicularis, the globes are rolled upwards and the pupils kept covered by the lids; the patient has great difficulty in looking downwards, complains of pain and photophobia, and shows marked fatigue as a result of the examination. The photophobia is not really influenced by light since it does not diminish in very subdued illumination.

These patients never move about as blind men would; they invariably avoid hurting themselves, but all the same they never relax, even if watched for weeks at a time, the groping action of people with extremely defective sight, and judged by every test they maintain this condition indefinitely and are undoubtedly psychically blind. The pupils react normally and the fundus shows no definite change. There is no difficulty in differentiating them

from malingerers, as they pass through long periods of real mental distress and serious discomfort. These cases vary enormously in severity; some recover rapidly, others seem to go indefinitely if not treated, or treated unsuccessfully. Any lack of recognition of the condition in the early stages enormously prejudices the prognosis. One patient having been told that he was blind remained so for several months, whereas probably if it had been recognized earlier that he was not blind and would recover he would have done so much more rapidly.

Early in the war these cases were treated, with rest, tonics, deprivation or punishments, confinement to bed or isolation, persuasion, encouragement, counter-irritation, talking, etc., but all these means were ineffective until suggestion and hypnosis were tried: the patient was placed in a comfortable arm chair in a darkened room, instructed as to what was to be attempted, told to think of something pleasant, not to notice the operator, to relax his mind and make it a blank, and then the usual methods of inducing hypnosis were employed. After a few minutes of light hypnosis, the patient was subjected to a forcible suggestion from the operator, who reiterated the patient's ability to see and to open his eyes, and to assert very vehemently that he was not blind as he imagined but that his eyes were perfectly sound and that he *could* see. Though the results varied as to rapidity of recovery, all have shown marked improvement. The histories of 7 examples of this sort are given. There have been no failures in treatment. The writer trusts that by publishing these cases greater attention may be drawn to these conditions, so that even if treatment cannot be applied at once the cases may not be prejudiced unfavorably by injudicious handling.

C. H. M.

TRAUMATIC RUPTURE OF EYEBALL, COMPLETE ANIRIDIA; PRESERVATION OF LENS, WITH PRACTICALLY NORMAL VISION.—HARBIDGE, D. F., Phoenix, Ariz. (*Ann. Ophthal.*, January, 1916). The patient, a man of fifty, while intoxicated, fell while attempting to mount a chair and struck his right eye on the protruding corner of another chair. He was seen shortly after by the author. He was very dirty. The lids were markedly ecchymosed, swollen, and moderately separated, the separation being occupied by clotted blood, debris, etc. The conjunctiva everywhere was infiltrated with fresh blood. To the nasal side, a few millimeters posterior to the limbus, was a large curvilinear wound $1\frac{1}{2}$ cm. in extent, the major portion of the wound occupied a position above the horizontal me-

ridian, the lower end curved about 1 mm. into the corneal tissue. The wound contained clotted blood and a few shreds of iris tissue, and a small prolapse of blood stained vitreous. No view of fundus was obtainable owing to blood in the anterior segment. Enucleation was proposed but the family did not take kindly to it, so the parts were flushed with boric solution, all debris, so far as possible, was removed from the wound by moist pledgets of cotton and the prolapsed vitreous snipped off. The conjunctiva was smoothed out, and one fine superficial suture was used to draw the tissues together. A light bandage and ice compresses were applied. The following morning conditions looked so favorable that it was decided to make an attempt to save the eye. Within a few days the anterior chamber reformed and the wound healed. At no time during the healing process was there severe pain or marked inflammatory reaction. In 13 days there was a definite reddish reflex and in 14 days more vision was 5/60. There was a complete absence of iris except for some waving shred-like tissue attached near the upper extremity of the wound. Seven months later the vision was 5/21, tension normal. Complete absence of iris tissue. At the iritic angle deeply pigmented ciliary processes showed, except at the site of the injury. Passing from this structure to the edge of the lens were to be seen the radiating fibers of the zonula. The lens was clear, save for a hazy nucleus. Many fine and a few large, shred-like vitreous opacities were present, apparently in the anterior portion. No deep fundus changes. He was not seen again for a year. The eyes were then perfectly quiet, and the lens clear. There was still a few large and small vitreous opacities. Vision 6/6 with +2. Cyl. ax. 150°.

The author now makes an abstract of the literature of this condition and finds forty or fifty cases of aniridia, with aphakia. The number of cases in which the lens was intact was decidedly less.

M. B.

WOUNDS OF THE OPTIC NERVE.—(Illustrated).—TRESLING, J. H. A. T. (*Tydschr. v. Gen.*, June 5, 1915), reports six cases from the clinic of Prof. van der Hoeve at Groningen; in 3 cases the optic nerve was wounded at the same side of the traumatism, twice at the opposed side and once at *one* side, while the chief traumatism was not localized especially at *one* side. The wound can be inflicted by the penetrating object itself, at the same or at the other side; indirectly through fracture or hæmorrhage at the traumatised or at

the other side. The visual defects can progress, retrogress or remain stationary. Only the sixth case will be recorded, the other ones not having any particular peculiar interest. Twenty-eight year old man has been stabbed with a knife, 11 days ago, below the left eye. Some time after he lost consciousness, and according to the physician he was under alcoholic influence. He had vomited, and bled from the nose and mouth, saw with O. S. but not with O. D.

Examination: O. D. ptosis, exophthalmus (Hertel 2 mm.), small temporal subconjunctival hæmorrhage, the bulb is immovable, pupil moderately wide without reaction: papilla hyperæmic, marked venous stasis with tortuosity of the vessels. The upper eyelid can be slightly lifted with effort, corneal sensibility lessened. V.= 0. O. S.: marked edema below the eye with, in the region of the zygoma, a 2 cm. long, partly closed granulating wound, in which is an iodoform gauze tampon. The wound has a depth of 2 cm. toward the nose, the sound gives an impression of denuded bone. The bone cannot be palpated on account of the edema, local pressure is very painful, no crepitation. Motility of the bulb normal with the exception of a somewhat diminished motility downward. V—5/5 E.

Next day (11 days after the accident) the right papilla becomes distinctly atrophic. Five days later a fracture of the zygoma can be felt. A Roentgenphoto is taken, which shows the blade of a knife in the skull. The broken part sits in the left zygoma, the point in the apex of the right orbit, while the cutting edge is directed forward. Strong force was needed for the extraction. It is a rusty piece of iron with a blunt point 9 cm. long by 2 cm. wide. Calculation proved the point 5 cm. deeper in the skull than the other end. The knife reached just past the optic foramen and the fiss. orbit. sup., so that all nerves there may have been cut. It went also below the inferior margin of the left orbit through the zygoma (without wounding the N. infraorb.) through the concha media, the septum, lamina papyracea of the right orbit, past the optic foramen and the fiss. orbit. sup. A rhinologic examination after the removal did not show any change.

A month after the trauma the right ptosis had disappeared, slight motility of the bulb was present: nystagmic movements when pat. tries. Cornea is still anaesthetic, eye is somewhat lower and outward, disc atrophic, with only very slight exophthalmus.

It is at least remarkable, that a man may run around for twenty

days with a rusty blade in his head without knowing it himself, while no reaction appears. E. E. B.

OPACITY OF THE LENS AFTER INJURY BY LIGHTNING.—LÖWENSTEIN, A. (From the eye clinic of Prof. A. Elschmig in the University of Prag. (*Klin. Mon. f. Aug.*, 55, p. 592), describes five cases without visual disturbances. In all opacities of the lens partly of one, partly of both eyes were found. These had the forms of dots or vesicles and were not progressive. All were situated in the posterior corticalis. The occurrence and the seat of the affection seem to be due to the high power of conduction of the contents of the eye. C. Z.

ON RARE FORMS OF HEMIOPIC DEFECTS OF THE VISUAL FIELD AFTER GUN SHOT INJURIES.—HEGNER, C. A. (From the eye clinic of Prof. W. Stock in the University of Jena (*Klin. Mon. f. Aug.*, 55, p. 642), reports three cases of clinically interesting disturbances of the cerebral visual path from injuries of the occiput. The first case presented a left-sided homonymous defect of the macular field, starting from the point of fixation, of about the size of the blind spot.

The second patient was very much handicapped in reading by a right-sided small hemianopic scotoma bordering on the median line. In both cases the damaging element consisted in continuous pressure upon the occipital lobe by a small piece of bone, which had led to total destruction of the cortical, resp. subcortical, parts. Although the pieces of bone were removed, the scotomas persisted unchanged.

In the third case a very slight lesion of the bone had produced a narrow sector of homonymous defect in the left inferior quadrant. The absolute scotoma gradually changed to a relative scotoma to the left and had no sharp borders, which indicated that the damaging factor consisted in a hematoma.

The small insular homonymous defect of the macular field in the first two cases was a new proof for the assumption of a strictly circumscribed localization of the macula in the cerebral cortex. The involvement of the macular region in these cases spoke against a double supply of the macula, so that H. considers the question justified, whether the often observed intactness of the macula is really due to a double supply or merely originates in the cortical organization of the macula. The injury affected the caudal end

of the occipital lobe, and the conclusion, that the region of the posterior pole belongs to the cortical representation of the macula, is here corroborated. C. Z.

ON DISLOCATION OF THE EYEBALL AND HEALING IN OF THE REPLACED EYEBALL.—REDSLOB, E. (From the eye clinic of Prof. E. Hertel in the University of Strassburg (*Klin. Mon. f. Aug.*, 55, p. 582). The right eye of a man, aged 48, was pushed by the horn of a cow through the floor of the orbit into the antrum of Highmore. The cornea was down, the sclera in front. After lifting the eyeball with an elevator into the orbit it was noticed that the conjunctiva was torn off at the limbus and all the ocular muscles, excepting a few fibers of the inferior oblique, but not the optic nerve. A few hours later the replaced eyeball was fixated by scleroconjunctival sutures. It healed in, with limited motility. In consequence of the stretching of the optic nerve, the disc became atrophic and vision was lost. There was also a rupture of the chorioid at the macular region. R. ascribes the preservation of the eyeball to the intactness of the ciliary vessels which play the most important part in the nutrition of the eye. The few cases published are quoted. C. Z.

TWO RARE INJURIES OF THE EYE BY SPINES OF PLANTS.—KRAUPA-RUNK, MARTHA, Teplitz (*Centralblatt f. prakt. Aug.*, 38, p. 283). A woman, aged 54, stated that, two weeks previously while she was mowing, burs flew into her left eye, which caused constant intolerable pain, so that she could not sleep. The lids were very much swollen and discharged muco-pus. The conjunctiva of the upper lid showed papillary swelling, and in the middle near the convex margin of the tarsus a red nodule from which a very fine yellowish pointed foreign body projected. This was removed with forceps and under the microscope was recognized as a prickle of the common burdock. The nodule was scraped out with the sharp spoon. It consisted of granulation tissue. The ocular conjunctiva was very red, the cornea lacked its lustre, its epithelium was swollen and was furrowed all over by deep scratches: the pupil was narrower than the right. The affection healed in a week under irrigations of oxycyanate of mercury and noviform-salve with V=1.

Case II.—A man, aged 61, complained for about a week of violent pain in his left eye and rapid failure of sight. The upper lid was swollen, the conjunctiva very red, secreted mucus and showed

papillary exuberation. After eversion and exposure of the retotarsal fold a thin greenish foreign body, about 15 mm. long, appeared on it, imbedded in thick mucus, lodged in a deep suppurating wound cavity, from which it was extracted with forceps. The eyeball was very red, the center of the cornea in an area of 4 mm. diameter was clear, but the whole peripheral portion converted into an ulcer to which marginal loops of blood vessels had spread. The eye was treated like that in the first case, and the irritation subsided after 10 days, leaving the corneal periphery deeply indented against the sharply projecting center. $V=0.1$. Microscopically the foreign body consisted of a husk with minute hooks. C. Z.

TO THE KNOWLEDGE OF TRAUMATIC ANGIOPATHY OF THE RETINA.—STÄHLI, J. (From the eye clinic of Prof. O. Haab in the University of Zürich. (*Klin. Mon. f. Aug.*, 55, p. 300). observed in a man, aged 39, who four weeks previously was thrown from a wagon and sustained contusions on the back of the head, and arms, with impairment of vision, extensive white glistening foci and some small hemorrhages in the papillo-macular region of both eyes. On the 35th day the whole region of the posterior pole of the left eye was covered with a continuous dense white veil, and at the macular region from 12 to 15 small, round, atrophic, yellowish, distinct dots were seen. The optic nerve, especially the temporal quadrant, was pale but well defined. The retinal vessels almost everywhere coursed over the white masses, only at a few places they disappeared for short distances under white clouds. The large branches of the central retinal veins were thickened, but tapered from $\frac{1}{2}$ to $1\frac{1}{2}$ disc diameters distant from the disc towards this. V. R. $1/10$; the left eye presented an immense central scotoma. The treatment consisted in subconjunctival injections of salt solutions and blood letting at the temple.

After a year V. R. was improved to $5/6$, L. not; here the macular affection remained. Both optic nerves looked atrophic.

S. considers the affection similar to the opacity of Berlin, which is due to transudation from paralysis of the retinal and chorioidal vessels, and caused like this by an indirect lesion, by the eyeballs moving against the apex of the orbit when the patient fell with his head violently on the curb. C. Z.

INJURY OF THE VITREOUS BY A PIECE OF COPPER.—VON SPEYR, TH., Chaux-de-Fonds, Switzerland (*Klin. Mon. f. Aug.*, 55, p. 388). The patient, described in *Klin. Mon.* 53, p. 194, who had

in June, 1914, $V=0.8$, returned in January, 1915, with $V=0.4$, and incipient secondary cataract. In May, 1915, V . fig. at 0.50 m., faulty projection, tension very much diminished, iris retracted like a funnel, fundus almost invisible, but the eye was not irritated and the other normal. The lesions of the vitreous by the injury and operation also here led to later deleterious shrinking of the vitreous with detachment of retina and incipient phthisis, another proof, how carefully in such cases the prognosis must be guarded at the beginning. C. Z.

ON THE SYMPTOMATOLOGY, PROGNOSIS, AND THERAPY OF ORBITAL GUN SHOT INJURIES WITH PROJECTILES REMAINING.—PLOCHEP, R. (From the eye clinic of Prof. Th. Axenfeld in the University of Freiburg. *Klin. Mon. f. Aug.*, 56, p. 27), reports the clinical histories, with epicritical remarks, of 15 cases, with photographs and skiagraphs, viz., four rifle shots of the orbit and accessory cavities, two in the immediate neighborhood of the orbit, three shrapnel shots and six larger grenade splinters in the orbit and accessory sinuses. The cases illustrate the great importance of early good Roentgen skiagraphs in sagittal and transversal directions. In consideration of the possible migration of the projectiles the Roentgen skiagraphs must be repeated in cases in which the operation is performed later. Several projectiles were deformed and showed an inverse position, indicating the impact of the projectiles somewhere outside the body, so that the injury had to be regarded as an indirect lesion. This also explains the remaining of the projectiles in the orbit since it must be surmised in general that rifle shots taking a direct course smoothly penetrate the skull or at best are arrested in the depth at the second osseous wall. It was peculiar how slight the subjective symptoms were, only five out of the fifteen cases complaining of more or less violent distress. Of objective symptoms the ocular palsies, exterior and interior, were predominant (in 7 cases), then exophthalmus (in 4), atrophy of the optic nerve (2) and rupture of the chorioid (2): optic neuritis occurred only in one with simultaneous infection. In seven the eyes were more or less destroyed, so that the above mentioned objective symptoms could not be searched for. Consultation of the rhinologist is imperative. Although the orbital operation is chosen more often, the extraction of the foreign body from the orbit with preserved eyeball may be more difficult and more dangerous on account of the many nerves and vessels than through the accessory sinuses. Careful study and observation of

each individual case is necessary, to meet the emergencies at the right moment, as there is no stereotype rule for or against operation.

P. summarizes the following conclusions: 1. Projectiles of rifles and shrapnels and larger grenade splinters in the orbital soft tissues must be removed. Medium-sized and smaller pieces of grenades frequently may remain, if there are no urgent indications. 2. Projectiles in the bony walls of the orbit must be treated differently in individual cases according to their more or less extensive connection with the soft parts and accessory cavities. One must be aware, that secondary empyemas and infections may be propagated from the sinuses if their walls are damaged, and especially if they harbor a larger foreign body. Here even later infections are possible, the physical or chemical nature of the foreign body having some influence. 3. Therefore projectiles in the orbit with total or partial seat in the accessory sinuses must be removed. C. Z.

CONTRIBUTION TO INFERIOR HEMIANOPSIA AFTER SHOT INTO THE SKULL.—MEYERHOF, M., Cairo, at present at Hannover (*Klin. Mon. f. Aug.*, 56, p. 62). reports a case of hemianopsia inferior for colors and scotomas after a grenade shot, grazing the occiput of a soldier, aged 24. The color defect was absolutely symmetrical. It must have been due to a lesion of the cerebral cortex at the upper lip of the calcarine fissure.

Another soldier presented bilateral partial hemianopsia downwards after a gun shot injury. At the posterior portion of the left parietal bone was a horizontal wound of entrance and at the right upper portion of the occipital squama a similar oblique wound of exit from which grey cerebral matter was bulging. Both wounds were coated with pus. An irregular defect was ascertained in the lower visual halves, ophthalmoscopic condition and central vision always being normal. The wound canal probably penetrated the left optic radiation and the upper portion of both visual cortical areas, extending farther down in the right, from which the encroaching of the scotoma upon the meridians XI and X may perhaps be explained. C. Z.

RETINAL DISTURBANCES DUE TO INCREASED AIR PRESSURE.—PAGENSTECHE, A. (*Muench. Med. Woch.*, Nov. 16, 1915). P. mentions briefly the various ocular disturbances that have occurred during this war, owing to increased air pressure, usually by ex-

plosion. Corneal opacities—rupture of the Zonule of Zinn—opacities and hemorrhages in the retina—chorioidal rupture—Berlin oedema—and glaucoma. He then describes two cases of retino-chorioiditic disturbances in the macular region where the only history of injury was that of increased air pressure. In both, the ophthalmoscope showed the presence of brownish-red or grayish-red punctate areas in the macular whose reflex was dimmed. Both recovered under inunctions. In case 1, the vision became blurred immediately following a grenade explosion that rendered the patient dizzy, but not unconscious. The ultimate vision was 6/6. In case 2, a shrapnel explosion occurred less than three meters away; the patient became unconscious and fell to the ground. Here, too, good vision resulted. P. believes that the concussion of the increased air pressure acts as a sort of blunt trauma, producing the macular lesions described.

H. S. G.

INSTRUMENTS AND METHODS OF EXAMINATION

A NEW LIGHT HEARING APPARATUS FOR THE WAR BLIND.—LAZARUS, P., Berlin (*Deut. Med. Woch.*, March 16, 1916). A selenium cell introduced into the circuit of an induced current changes the resistance, upon being illuminated, sufficiently so that the change becomes audible in a telephone receiver attached to the circuit. By this apparatus, a patient proved to the society that the intensity and direction of a light of only moderate strength can be demonstrated accurately.

H. S. G.

AN IMPROVISED GIANT MAGNET.—ISAKOWITZ, from the West Front (*Muench. Med. Woch.*, Apr. 11, 1916). A giant magnet for field improvised work from an abandoned French dynamo.

H. S. G.

A SIMPLE APPARATUS TO REMOVE FOREIGN BODIES FROM THE CORNEA.—RICHTER, Kiel (*Muench. Med. Woch.*, Apr. 11, 1916). A horse-hair loop fastened to the end of a rod. The loop is kept sterile by constant immersion in a formalin solution.

H. S. G.

ON THE MEASUREMENT OF THE DEPTH OF THE ANTERIOR CHAMBER WITH A NEW INSTRUMENT, INTENDED FOR CLINICAL USE.—LINDSTEDT, FOLKE (From the eye clinic of Prof. A. Gullstrand in the University of Upsala. *Archiv. f. Aug.*, 80, p. 104). gives a very interesting synopsis of the former methods, calculations and

theories, and, after an exposition of the chief principles, describes his new instrument, which allows rapid measurements of the depth of the anterior chamber without calculations. L. believes that a systematic examination of the depth of the anterior chamber in different forms of increased intraocular tension, and at different ages and states of refraction, may yield important results for the conception of the nature of different forms of glaucoma. C. Z.

A TRANSPORTABLE DARK ROOM.—LUNDSGAARD, K., Copenhagen (*Klin. Mon. f. Aug.*, 55, p. 641). This consists of a strong umbrella to the edges of which a cloth is attached in form of a train. C. Z.

EXAMINATION OF THE REFLEX IMAGES OF THE EYE WITH A LOUPE BEHIND THE OPHTHALMOSCOPE.—ELSCHNIG, A., Prag (*Klin. Mon. f. Aug.*, 56, p. 23). On observing the reflex image of the cornea with +20 behind the ophthalmoscope any change of curvature of the cornea can be recognized by an alteration of the reflex image, and the slightest irregularity of the epithelium by corresponding distortion or dotted reflexes in the reflex image. In the same manner E. noticed from irregularities of the image of the posterior capsule of the lens very fine opacities in the parts of the lens near the posterior capsule, which were very difficult to see in transmitted light. C. Z.

MEASUREMENTS WITH HERTEL'S EXOPHTHALMOMETER.—SCHLABS, G. (From the eye hospital of the Silesian County Insurance Institute under the direction of Prof. A. Groenouw, Breslau. *Klin. Mon. f. Aug.*, 55, p. 611). examined on 50 cases to which degree of exactness in millimeters the measurements with Hertel's exophthalmometer can be made and whether physiological fluctuations in altered positions of the head can be ascertained with this apparatus. The figures are arranged in tabular form. S. found that the measurements with Hertel's exophthalmometer for clinical observations undoubtedly are of perfectly sufficient exactness. C. Z.

IRIS

HERPES IRIDIS AND KERATITIS DENDRITICA PROFUNDA.—ZEE-MAN, W. P. C. (*Tydschr. v. Gen.*, January 22, 1916), reports the following case: An 18 year old girl is taken into the hospital for diarrhoea, some weeks lasting, on Sept. 4. She came from a healthy

family of 12, she seemed to have been healthy before. In the hospital the cause could not be found; in bed and with proper diet the symptoms disappeared. On Sept. 12 O. S. became red. A slight pericorneal injection, slight haziness of the cornea, a few Descemet's spots, and a moderate iris-hyperaemia made the diagnosis of Iridocyclitis. The pupil dilated under atropia with the exception of the temporal side, where the iris margin showed a thickening; the bluish-red color of the small knob suggested a small hæmorrhage; to the temporal side a few small pinhead-like efflorescences were visible. On Sept. 29 the eye is perfectly quiet; the cornea is pretty clear; however, a peculiar fine opacity exists in the deepest layers, with the form of the opacity as found in superficial keratitis dendritica; fluorescein did not stain. At the posterior side of the cornea, at the location of the described opacity still a few spots on Descemet's M. are seen; pupil had become entirely round and at the place of the previous knob only slight swelling existed. The progress continued and on October 27 the eye is pale, the cornea clear with the exception of a slight curving and branching line in the deepest layers, which continues from the temporal margin until well over the center. In the iris at the spot of the previous knob marked atrophy appeared and also a part of the normal iris-collar was absent, so that the atrophy seemed to extend through the entire thickness of the iris. Even six weeks later the line in the cornea was visible, and also some spots on Descemet.

Any form of metastatic iritis could not account for the peculiar corneal change. Rather this change points in another direction. It shows a great similarity to dendritic keratitis, which goes as a condition related to herpes corneae and would come in the class described by Gilbert.* The deep position of the dendritic changes in the cornea shows independence of the, sometimes concomitant, epithelial vesicles, and its peculiar appearance makes one think of a process, which follows the corneal nerves, perhaps a neuritis or perineuritis visible to the naked eye. E. E. B.

A CASE OF SPONTANEOUS CYST OF THE IRIS WITH ANATOMO-PATHOLOGICAL DESCRIPTION.—BÜHM, K. (*From the eye clinic of Prof. W. Uthoff in the University of Breslau. Klin. Mon. f. Aug.*, 56, p. 70). The right eye of a boy, aged 7, showed slight injection, cornea clear, the anterior chamber in its inferior temporal portion abolished, otherwise shallow; the pupil did not react. The iris was not clearly delineated and showed a cyst in its lower temporal

*Samml. Tw. Abhandl., IX, 2.

portion, translucent, filled with fluid and lying close to the posterior surface of the cornea. As there was no perception of light and the eye glaucomatous, it was enucleated.

The microscopical examination is described in detail: The cyst, of unknown etiology, lay in the mesodermal part of the iris, the stroma itself, from which it had started, and filled the whole anterior chamber from the lens to the cornea. The pupillary margin and the root of the iris did not participate. The optic nerve showed a distinct pathological excavation. The lens was indented in consequence of the growth of the cyst. The cyst contained cast off epithelial cells, cell detritus and a homogeneous exudate.

B. attributes the development of the cyst, according to the theory of Juselius, to remnants of the ectoderm, which during the embryonic period was not transformed into muscles of the iris, since the sphincter at the side of the cyst had remained rudimentary. Also on the normal side it was interrupted by septa of connective tissue. The anterior wall of the cyst was very thin and consisted solely of an epithelial layer, adherent to Descemet's membrane. The iris tissue was probably from atrophy by pressure. C. Z.

LACRIMAL DISEASES

THE USE OF LEAD STYLES IN THE TREATMENT OF THE NASAL DUCT. — MOULTON, H., Fort Smith, Ark. (*Ann. Ophthalm.*, Jan., 1916). The author presented this subject in 1908 and has been its champion for many years. He uses the electrician's fuse wire instead of lead. The caniliculous must be slit and the lachrymal duct well dilated before the style is introduced. Care must be taken to probe for the lachrymal probe under the inferior turbinate body to see that it is actually in the nose. The style must not be too short, because if it is it may drop down and its bent end be in the lachrymal sac from which position its extraction is difficult and painful. If too long it does not ride well. It should be tried in position several times until its length is just short of resting on the floor of the nose. The upper end is bent at right angles to form a lip which has just a little downward bend and rests in the slit caniliculous. The bend of this lip will have to meet the requirements of each case and upon its resting in the caniliculous and not outside of it depends the comfort of the patient. Generally speaking the patient should wear the style for a year or more and come for monthly readjustment and cleansing of the style.

M. B.

DIGITAL COMPRESSION OF THE LACRIMAL SAC IN DACRYOCYSTITIS, ESPECIALLY OF THE NEWBORN.—SANTOS-FERNANDEZ, JUAN, Havana, Cuba (*Arch. Ophthalm.*, March, 1916, XLV, 117), advocates the employment of digital compression of the sac, in certain cases, in dacryocystitis and especially in the newborn. He states that this method of treatment must be properly performed, requires practice, and gives his method of procedure. The author refers to the closure of the lower exit of the naso-lacrimal canal as being the most frequent cause of congenital dacryocystitis and states that vigorous pressure upon the sac will break the membranous occlusion. In connection with pressure upon the sac, he uses antiseptic injection through the dilated punctae. Catheterism is used only when digital compression and irrigation fail. W. R. M.

SUTURE OF THE LACRIMAL CANALICULUS.—RAUPP, R., Kaiserslautern (*Klin. Mon. f. Aug.*, 55, p. 3881), devised the following simple method for reuniting the several lacrimal canaliculus. The whole thickness of the nasal portion of the lower lid was cut a few mm. from the lacrimal point. At first a suture was placed through the conjunctiva and another one through the skin of the lid. Then a fine needle of a double-armed black silk suture was inserted into the proximal wound opening of the canaliculus at 3 mm. distant pierced through the intermarginal seam upwards. The other needle was led from the distal wound opening of the canaliculus through the canaliculus and out of the tear point. The wound surfaces were adapted by pulling the thread taut and tying it. Then some more lid sutures were applied. The thread through the canaliculus was cut after two days, the others several days later. The result was cosmetically and functionally perfect and remained so. C. Z.

LENS

CONTRIBUTION TO THE PROGNOSIS OF DISLOCATION OF THE LENS.—HEGNER, C. A. (*From the eye clinic of Prof. W. Stock, in the University of Jena. Klin. Mon. f. Aug.*, 55, p. 351), reports his observations on 65 cases of the clinic and the very abundant material of the Silesian eye clinic of Breslau, under Dr. Meyer. The majority of traumatic dislocations of the lens occurred in older people, 70% being over 45 years. This is due to the changes of the zonular fibers, which with advancing age lose their elasticity and are diminished in numbers. For comparing the course of the

different forms of dislocation of the lens H. groups them under partial, total dislocation into the vitreous, into the aqueous, congenital, and spontaneous dislocations.

Secondary glaucoma is the most frequent and most dangerous complication of partial dislocation. It occurred in 20 out of 24 of H.'s cases, i. e. 83.3%, in some the second day after the injury. The treatment of the secondary tension in most cases was of no avail, as miotics and anti-glaucomatous operations had no influence. This shows the malignancy of this form of secondary glaucoma. The extraction of the partially dislocated lens is very dangerous and in many cases entails the complete loss of the eye. Only in one out of eight extractions good vision was obtained. The reason for this bad prognosis are the changes of the vitreous and the suspensory ligament.

Only in two out of the 11 cases of total dislocation of the lens into the vitreous secondary glaucoma occurred. If the lens is totally and freely movable in the vitreous, the most important element for the onset of glaucoma, the abnormal traction of the suspensory ligament, is removed. The lens becomes totally opaque and may shrink, but is never absorbed. The examination with the Nernst lamp showed floating opacities of the vitreous and in some cases numerous very fine dust, perhaps cellular conglomerations in consequence of irritation of the uvea. A few cases had almost normal vision from 10 to 18 years after the accident, showing the favorable termination in total dislocation. This and the favorable experiences of some authors seem to justify to perform reclinatio in cases in which a partial dislocation produced secondary glaucoma.

Spontaneous of traumatic dislocation into the anterior chamber is a very dangerous condition. In 13 out of 16 cases the extraction was attempted. In 5 the eye was lost, useful vision was attained only in 3. In one an expulsive hemorrhage occurred. The chief danger in these extractions lies in the almost certain loss of vitreous.

Eight cases of congenital and 5 of spontaneous dislocation were observed. The congenital ectopia generally gives no bad prognosis. In none a total dislocation or glaucoma set in. C. Z.

LIDS

CONGENITAL LAGOPHTHALMUS IN FOUR GENERATIONS.—PETERS, RICHARD (*From the eye clinic of Prof. A. Peters in the University of Rostock. Klin. Mon. f. Aug., 55, p. 308*), observed this condition in two sisters and the mother, who stated that also her mother

and grandmother showed the same peculiarity. The upper lids were retracted so that a part of the sclera above the cornea was visible. The lower lids were slightly everted, and the palpebral fissure could not be closed completely. An increased function of the sympathetic nerve could be excluded, and there were no signs of paralysis of the lower branches of the facial nerve. Hence there was no increased function of the levator muscle, but a defective function of the orbicularis muscle. The intense retraction of the upper lid was explained by the dynamic preponderance of the normally functioning levator. The flabby hanging down of the lower lids was due to the defective function of the orbicularis, especially Horner's muscle, with subsequent epiphora. The incident literature is quoted.

C. Z.

MATERIA MEDICA AND THERAPEUTICS

THE APPLICATION OF THE WASSERMANN REACTION AND THE LUTIN TEST IN OPHTHALMIC PRACTICE.—MACKIE, THOMAS J. and MANSON, W. HISLOP, Glasgow (*Oph. Review*, December, 1915). It is assumed that a positive Wassermann reaction elicited by a reliable method is valid evidence of the presence of syphilis and that the negative result is of less definite significance, for in the tertiary and latent stages of the disease only 75 per cent. and 50 per cent. respectively of cases yield a positive reaction. In ophthalmic practice the great prevalence of the syphilitic basis has long been recognized by clinical observation. As a result of certain investigations on a large number of unselected cases, Manson, Mackie and Smith showed that, excluding such conditions as ocular injuries, conjunctivitis, cataract, and the ordinary errors of refraction, about 50 per cent. of cases of all other ocular affections collectively were associated with positive Wassermann reactions. Since many of these lesions occurred in the later stages of the disease, or at a period of apparent latency, it was further concluded that this statement of prevalence was in all probability an underestimate. In view of this and in order to ascertain whether those cases of ocular syphilis, which had failed to react in the Wassermann test, might respond to Noguchi's luetin test, the writers carried out some further investigations in which the luetin reaction was used in conjunction with the Wassermann reaction. Noguchi claimed that his test was specially marked in the tertiary and latent stages of syphilis and that it bore no relationship to the properties

of blood serum on which the power of reacting in the Wassermann test depended.

Thus by employing the Wassermann and luetin tests more information was likely to be obtained than where one of these only was used. In view of this the luetin test was first applied to certain of those cases originally examined which yielded a negative Wassermann reaction in order to detect the cases of late syphilis which failed to react to the Wassermann test. A table is given showing the results. In 35 cases in which the Wassermann reaction had been negative, 19 positive luetin reactions were obtained; of 13 cases with positive Wassermann, 9 yielded negative luetin reactions; 2 cases with doubtful or weakly positive Wassermann reactions were also definitely positive to the luetin test. An analysis of the results obtained follows.

In conclusion the writers express the conviction that the luetin reaction represents a characteristic and definite cutaneous reaction to the products of the spirochaete pallida; that their results show that the systematic application of the Wassermann and luetin reactions together is valuable in any branch of practice; and that, since it has been shown that the luetin test alone may be of little significance unless positive and the same applies in some degree to the serum test, their results demonstrate the value of the luetin reaction as a supplementary test to the Wassermann reaction, since in that class of cases where the serum reaction is frequently negative, the cutaneous test is likely to yield a definitely positive result.

C. H. M.

THE USE OF OPTOCHIN IN EXTERNAL EYE DISEASES, EXCLUDING PNEUMOCOCCIC INFECTIONS.—WYLER, JESSE S., Cincinnati (*Ann. Ophthal.*, January, 1916). Optochin is an ethylhydrocuprein hydrochloride, is freely soluble in water, and was put on the market as a specific for pneumococcic infections of the eye. In Stanculeanu's clinic some remarkable results were obtained from its use in cases of gonorrheal ophthalmia. This prompted the author to try it in various conditions. Two cases of vernal conjunctivitis obtained complete relief from 1% optochin at two hour intervals when everything else had failed. Three cases of cicatricial trachoma with pannus were much benefited from frequent instillations of a 2% solution. Two cases of luetic interstitial keratitis were in no way benefited. Three cases of phlyctenulosis were improved. One case of ophthalmia neonatorum (Gram negative) made most astonishing improvement and was apparently well

on the ninth day. The cornea then became cloudy and melted as in keratomalacia. The child's general condition was poor. His second case was from self-infection in a negro woman. The cornea was opaque when the case was first seen. On the ninth day's use of optochin 2% hourly the pus had almost stopped, the cornea had not sloughed, and the swelling had receded. His service at the hospital ended at this time and the treatment was changed by his successor, so that the remainder of the history has no bearing.

M. B.

CLINICAL EXPERIENCES WITH OPTOCHIN.—GRADLE, H. S., Chicago (*Klin. Mon. f. Aug.*, 55, p. 362). saw in 26 cases of an epidemic of infection of the conjunctiva with pneumococci the edema of the lids disappear within 24 hours and the secretion within 72 hours after instillations of optochin hydrochlor. in 1% solutions. In cases of purulent dacryocystitis the pneumococci disappeared after injections of optochin, but the suppuration persisted.

Optochin also showed a specific action against the xerosis bacillus in a case of trachoma and a case of xerosis of the conjunctiva and extreme dryness of the throat. After two weeks the eyes were normal and also the distressing symptoms of the throat subsided after the application of optochin.

C. Z.

SPECIFIC THERAPY OF ULCUS SERPENS CORNEAE.—AUGSTEIN, A., Bromberg (*Munch. Med. Woch.*, April 11, 1916). The general practitioner cannot follow all of the details of modern ophthalmology, but should be informed of the important recent advances, such as the advent of optochin. By means of this drug, the author claims that every eye affected with a serpiginous ulcer can be saved. The general clinical picture was hastily given and emphasis laid upon the early and thorough microscopic diagnosis. As we possess specifics in zine sulphate and optochin against the majority of corneal ulcers, we should be able to save every eye thus affected.

H. S. G.

OPTOCHIN AMAUROSIS.—FEILCHENFELD, W., Berlin (*Deut. Med. Woch.*, March 16, 1916). Five grams of optochin were given to a 20-year-old pneumonia patient in hourly doses of 0.2 grams each. Within two days poor hearing developed, and on the next day there was a decrease in vision. Complete blindness set in on the subsequent day. The pupils were found to be dilated ad maximum. The fundi were normal except for a narrowing of the vessels on

the disc. Sodium iodide was given in large doses, as well as tincture of strophanthus. Under this treatment there was a gradual recovery, first of the hearing and eventually of the sight. Two months later the corrected vision was 6/6, although there was a concentric contraction of the visual fields and large paracentral scotomata. Hemeralopia and "Flimmer" scotoma gave the patient a great deal of subjective annoyance. The ophthalmoscope showed a bilateral optic atrophy.

H. S. G.

THE ACTION OF SUBCONJUNCTIVAL INJECTIONS OF SALT SOLUTIONS IN INTRAOCULAR COMPLICATIONS OF HIGH MYOPIA.—MALLWITZ, A. (*From the eye clinic of Prof. A. Peters in the University of Rostock. Klin. Mon. f. Aug.*, 55, p. 365), gives a very good review of the literature on subconjunctival injections, the explanation of their action and their indications. He then compares the results of the former treatment, at the clinic, of chronic intraocular processes and complications of myopia with diaphoresis, internal administration of mercury or iodine, blood-letting at the temple with Heurteloupe's apparatus and dark room cures with those obtained by subconjunctival injections of salt solutions. The percentage of improvement was almost exactly alike. The treatment with subconjunctival injections, however, has so many advantages over the old methods that they are urgently recommended.

C. Z.

MEDICAL SOCIOLOGY

THE BLIND IN THE STATE OF WASHINGTON.—BENTLEY, FREDERICK, Seattle (*Northwest Medicine*, March, 1916), reviews the statistics for Washington according to the last census. He believes the number to be nearer 1,000 than 439, as given in the census. He attributes this to the fact that the enumerators were not careful in ascertaining the exact number and bases his estimate on de Schweinitz' estimate of 100,000 blind in the United States. The comparative small number in Washington and the Coast in general he attributes to the fact that it is comparatively a new settlement. The same is true of cataracts and glaucoma. The comparative absence of trachoma, the large number of ophthalmologists to the population, the climatic and hygienic conditions are also factors to be considered. He reviews the work that has been done in behalf of the blind, the school, libraries and other beneficial measures now in operation.

G. W. S.

THE FUTURE OPHTHALMOLOGIST.—MCCOOL, J. L., Portland, Ore. (*Northwest Medicine*, March, 1916), discusses the requirements for special work, the hope of better training, the part that the optometrists are playing in the field of refraction, the reasons leading to and the sources of support of the optometrist movement. He makes strong appeal to all men entering and engaged in ophthalmology to become proficient in the three branches, surgery, treatment of diseases and refraction of the eyes. He closes with a brief resume of the situation at present. It is a very interesting paper and one that inspires one with greater regard for the field of ophthalmology.

G. W. S.

ON THE INFLUENCE OF WEARING CATARACT LENSES ON THE EARNING POWER.—MARZOLPH, G., Breslau (From the hospital of the Silesian County Insurance Institute at Breslau (*Klin. Mon. f. Aug.*, 55, p. 488), investigated the questions: 1. Can a laborer, operated upon for cataract, work at all with cataract glasses, 2. What kind of labor can he do, and 3. How much can he earn in a year by this work? Fifty-one cases are described in detail, from which M. concludes that the objective conditions of the eye and vision with glasses are the only determining factors for judging the working and earning ability of a laborer who wears cataract glasses. The County Insurance Institute of Silesia takes the standpoint, that a visual acuity of down to 1/10, even of only one eye, suffices for earning the legal annual minimum wages by manual labor, which requires moderate demands of vision, as e. g. farm or common day laborer's work. Each case must be judged individually and independently of a certain schedule.

C. Z.

VISUAL NEUROSES OF MINERS IN THEIR RELATION TO MILITARY SERVICE.—HARFORD, CHARLES E. (*Brit. Med. Journ.*, Mar. 4, 1916). The writer gives his experiences with a number of cases of this anomaly who had found their way into the army and considers it of interest to record the persistence or aggravation of the defects when the men are removed far from former scenes and employed above ground. He considers that the group of associated symptoms usually known as "miner's nystagmus" constitute a distinct disease, but considers the name unfortunate since the nystagmus is only one symptom out of a group and may be absent. He gives the histories of ten examples of this anomaly and reviews the symptoms as follows:

The defect in vision varied but was usually the chief complaint:

there was usually some error of refraction but not enough to account for the reduction in vision; there were no abnormalities of the fundus. Next to the visual disability, the occurrence of more or less pronounced attacks of giddiness was a reason for the cases coming under observation. Intolerance of light was present in some measure in practically every case, and this symptom may be responsible for the blinking of the eyelid in some cases, the drooping of the lids in others, and the difficulty which was generally experienced in looking upwards; this was probably due to irritability of the retina. Headache was very common and in most instances associated with injuries to the head received in the pit.

Perverted visual impressions were quite common and included various apparent movements of lights; most observers associated these with the nystagmus but the writer considers this doubtful since in other forms of nystagmus there is no occurrence of similar visual impressions; the meeting of lights shining out of darkness, whether they are lamps in a pit or gas lamps on a dark road, seems to set up peculiar disturbances of vision which greatly distress the patient and interfere with many occupations. The symptom which has been referred to as "night blindness" is hardly a true "night blindness," but darkness seems to accentuate most of the symptoms, and it is a strange anomaly that "fear of the light" and "fear of the dark" should be present in the same cases.

In spite of the fact that the cases were not spoken of in the patients' hearing as "miner's nystagmus," and that no diagnosis was put upon their sheets, yet all seemed to be introspective and oppressed by their condition.

In those cases which have for months been working above ground the nystagmus was either not present or was at least very difficult to detect.

The writer next takes up the question of the effect of military service upon the affection and believes it to be a serious mistake for such patients to be subjected to the arduous strain of such work. He considers the anomaly as a serious handicap to military efficiency; when it is remembered that vision may be impaired without obvious cause, that at night it may be reduced to a minimum and that attacks of giddiness may come on at any time, it will be admitted that the presence of such a man might prove a source of serious danger to his unit.

In conclusion he expresses the view that the affection used to be more carefully studied by the neurologist rather than by the

ophthalmologist since he regards the "disease" as a general nervous ailment and that too great prominence should not be given to the nystagmus which is but one of the symptoms. C. H. M.

MISCELLANEOUS

BUSINESS AND OFFICE METHODS IN SPECIAL PRACTICE.—EMERSON, LINN, Orange, N. J. (*Ann. Ophthalm.*, January, 1916). This paper must be read in the original as it contains too much material to be boiled down into an abstract. The author has a good business head and has studied carefully methods of economy of time to enable him to do a large volume of practice. M. B.

OCULIST VERSUS OPTICIAN.—LEWIS, FRED D., Buffalo (*Jour. Ophthalm., Otol. and Laryngol.*, February, 1916). The sense of sight is the most important and the most abused of all our special senses. He reports cases showing how the correction of errors of refraction stop ailments of other organs of the body. Because of this relation he deplores the effort of the optician to fit glasses, and advocates educating the public to a full realization of the importance of having their eyes examined by an oculist. M. B.

MUSCLES

TENOTOMY OF THE INFERIOR OBLIQUE MUSCLE.—POSEY, WM. CAMPBELL, Philadelphia (*Arch. Ophthalm.*, March, 1916, XLV, 137), refers to Landolt's indications for above operation (*Archives d'Ophthalmologie*, 1885), quotes Duane's indications for the operation, and summarizes as follows:

A. Complete stationary paralysis of the superior rectus of the other eye, especially when this paralysis is traumatic or congenital.

B. Partial paralysis or even slight insufficiency of the superior rectus of the other eye when, owing to fixation being performed by the latter, the fellow develops a spasm of the inferior oblique so pronounced as to give rise to a disturbing (even if unnoticed) diplopia, a disfiguring upshoot of the affected eye, or a lasting torticollis. Such an indication is furnished especially by congenital cases.

C. In spasm of the inferior oblique, either secondary to paralysis of the superior oblique or some muscle in the same eye, or else occurring as a primary affection, provided in either case the deviation and diplopia produced by the spasm are sufficiently dis-

turbing to warrant an operation, and provided also that the condition gives good evidence of being stationary.

The author has done tenotomy of the inferior oblique in 17 cases and gives the clinical histories of 8 cases. Technic of operation is given and the author states that the results of the tenotomy were all more or less satisfactory. The article is illustrated.

W. R. M.

WHEN IS OPERATION INDICATED IN STRABISMUS? PRESENTATION OF CASES.—LEFEVER, C. W., Philadelphia (*Jour. Ophthalm., Otol. and Laryngol.*, February, 1916). In the concomitant squints of childhood the error of refraction should be corrected as soon as the squint is in evidence. The glasses should be constantly worn and operation should not be considered until they have been worn several years and proven insufficient for the correction of the squint. If the child is past seven years of age and has never worn glasses and his squint is high it is improbable that it can be corrected by glasses alone. The older the patient the less influence glasses will have in curing the squint. In all cases where, after a few years trial glasses have not effected a cure operation is advisable. In the divergent and vertical squints operation has to be resorted to.

Operation in paralytic squint is indicated only after a considerable time has elapsed and only then when considerable power has been restored to the paralyzed muscle.

In the latent squints operation is the last thing to be resorted to.

M. B.

NERVOUS SYSTEM

NEUROLOGY AND THE EYE.—BAYLEY, W. D., Philadelphia (*Jour. Ophthalm., Otol. and Laryngol.*, February, 1916). The expression of the eye depends upon its draperies. Minor degrees of refractive defect are responsible for the more serious reflex symptoms. As a general principle in a given neurosis, if there be eyestrain it must be removed the same as any possible source of irritation elsewhere in the body. He does not agree with the writers who attempt to formulate diagrams of the kind of headaches which are even usually ocular. When the neurologist wants a refraction he wants it done with a mydriatic and by a man of skill. Bad boys and ne'er-do-wells may need the oculist much more than they require the preacher. Hysterical blindness is usually unilateral. The abducens is by far the most liable to impairment in intracranial

disease, by reason of the long and exposed course of the sixth nerve. Fourth nerve paralysis is suggested by the appearance of diplopia on looking downward. Transient diplopia coming on in the adult is suspicious as an early symptom of brain syphilis. The Argyll-Robertson complex may be regarded as presumptive evidence of syphilis of the nervous system. In cerebellar lesions nystagmus is a frequent symptom. It is worse when the eyes are turned and fixed toward the side of the lesion. If it be tumor, optic neuritis is uniformly present. Choked disc is an oedema of the optic nerve. It is caused by any condition obstructing ocular circulation or which increases intracranial pressure. Optic neuritis is an index of some poisoning, infection, or gross organic disease. M. B.

DISTURBANCES OF VISION FROM CEREBRAL LESIONS, WITH SPECIAL REFERENCE TO THE CORTICAL REPRESENTATION OF THE MACULA.—LISTER, COL., London, and HOLMES, GORDON, London (*Report of Ophth. Sect., Royal Soc. Med.*, March, 1916, *Medical Press*, March 29, 1916). The authors stated that in their work at the base hospitals in France during the past eighteen months they had observed a very large number of cases in which the vision was affected by lesions of various portions of the optic system, but the time and opportunity afforded have not been sufficient for careful and complete examination of all. Hence, in some cases of considerable clinical importance only scanty and incomplete notes had been secured. Still, by selecting for thorough examination a certain number of suitable cases, a group of facts had been collected which had an important bearing on the cerebral localization of vision, more particularly on the representation of different regions of the retina in the cortex. It might be objected, say the authors, that as the observations were, necessarily, made at an early stage after the infliction of the injury, some of the effects observed may have been due to functional disturbances, rather than to local injuries of the corresponding cortical areas or their centripetal fibres. But if it could be shown that there was a constant relation between the probable site of the injury and the form of the visual defect, certain general conclusions would be at least justifiable. The injuries in the cases referred to included penetrating and perforating wounds of the cranium by rifle bullets, shell fragments and shrapnel, as well as local concussion and depressed fractures. They remarked on the striking rarity of superior quadrantic hemianopia in gunshot wounds of the occipital region.

The authors point out that in over two thousand cases of head injury they never saw a central scotoma when a direct injury of the occipital poles could be excluded, and they regard this as striking evidence that central vision is represented on either or both, the mesial or the lateral surface of the posterior borders of the occipital lobes. And the observations conformed to the general view that the visual area corresponds with, or at least includes, the area striata.

The interesting question is raised in the paper as to whether vision for colors may be dissociated from that for white: in other words, whether an achromatopsia can be produced by cerebral lesions. They consider, however, that they have gleaned no conclusive evidence that achromatopsia, with intact vision for white is produced by cerebral lesions which involve either the cortex or the optic radiations.

The authors' conclusions, which they do not yet regard as final, are formulated as follows: (1) The upper half of each retina is represented in the dorsal, and the lower in the ventral, part of each visual area. (2) The center for macular or central vision lies in the posterior extremities of the visual areas, probably on the margins and the lateral surfaces of the occipital lobes. (3) That portion of each upper quadrant of the retina in the immediate neighborhood of, and including the adjacent part of the fovea centralis, is represented in the upper and posterior part of the visual area in the opposite hemisphere, and vice versa. (4) The center for vision from the periphery of the retina is probably situated in the anterior end of the visual area, and the serial concentric zones of the retina from the macula to the periphery are probably represented in this order from behind forwards in the visual area.

C. H. M.

PARALYSIS OF THE THIRD NERVE AS FIRST SYMPTOM OF AN ABSCESS OF THE FRONTAL LOBE, AND A CASE OF BILATERAL ABSCESS OF THE FRONTAL LOBES.—HÖNIG, H. (From the eye clinic of Prof. A. Elschnig in the University of Prag. (*Klin. Mon. f. Aug.*, 55, p. 382). A boy, aged 14, who had suffered for three weeks from severe headache, presented a paralysis of the exterior branches of the left third nerve, and paresis of the labial branches of the left facial nerve. There was catarrhal rhinitis, hyperplasia of the pharyngeal tonsil, but no certain symptoms of an empyema. Four days later also the interior branches of the third nerve were para-

lyzed, and nystagmus of the right eye set in. A lumbar puncture yielded scarce lymphocytes. After further four days death in convulsions.

The autopsy revealed an abscess of the left frontal lobe, with extensive edema of the environment, pressure on the left lateral ventricle and flattening of the gyri, catarrhal inflammation of the left frontal sinus with thickening and hyperemia of the mucous membrane. The right frontal sinus was lacking. The exudation of the frontal sinus and the abscess of the frontal lobe contained the same kind of gram—positive cocci. The left frontal sinus was completely closed towards the nose.

The paralysis of the third nerve was probably caused by the pressure upon the left lateral ventricle, and the nuclei of the third nerve, but a toxic lesion of the nuclei from the abscess might not have been excluded. There were no ophthalmoscopic changes.

Then a case of injury by rifle shot of the right zygomatic bone, right eye, root of nose, and orbital portions of both frontal bones is reported, followed by an abscess of the right frontal lobe, which was successfully operated upon. C. Z.

OPERATIONS

CONJUNCTIVAL PLASTIC WITH PENETRATING WOUNDS OF THE EYE AND THE RELATIONS TO SYMPATHETIC OPHTHALMIA.—VERWEY, A (*Tydschr. v. Gen.*, October 23, 1915), has for years been accustomed to excise the prolapsed parts in penetrating ocular wounds and to close the wound with conjunctiva. He came to relate his results, because some weeks after he had treated the wounded eye of a boy, the second eye showed symptoms of sympathetic inflammation.

The conjunctiva can be brought over the wound as a curtain or as a bridge or entirely through a tabasac suture. Verwey liked this last procedure as the most conclusive and simplest. During the last few years he has treated 24 cases with perforating wounds. In general the patients could be treated ambulatorily after a few days: the wounded eye was soon quiet. Even with ten large wounds the bulb was saved. Rarely beforehand the ultimate vision can be predicted. Eight times the cornea was wounded, four times the sclera, twelve times both. No conjunctival plastic was made in six cases and only the prolapse excised, sometimes because the wound was small, sometimes because the children were unwieldly. Good vision (between 0.4 and 0.7) remained in seven cases, two of which

were treated without conjunctival plastic. The curtain plastic was done ten times, the tabacsac-method eight times. One was an arrow wound of cornea and sclera with prolaps of iris, corpus ciliare and vitreous with lens. Excision of the prolapsed parts with tabacsac-plastic. The eye remained irritated, without being painful on pressure; V. became 0; 24 days after the traumatism the other eye showed slight ciliary injection. V. diminished to 0.4. Posterior synechiae yielded to Atrop. No other symptoms. The diagnosis of sympathetic ophthalmia was made, because the presence of irritation symptoms of the wounded eye was followed soon by the plastic iritis of the second eye. The first eye was enucleated 32 days after the accident. The iritis of the second eye healed quickly with Atrop. and sublimate pills internally. V. with $+1. \text{ sph.} = 0.6$. Microscopically the retina and posterior parts of the choroid were normal. The ciliary body and those parts of the iris, which had grown together with the corneal wound, are replaced by a dense tissue with many spindle-shaped nuclei, which looks exactly like young connective tissue. No infiltration with lymphocytes, epithelioid or giant cells: which are of diagnostic value for sympathetic ophthalmia, according to Fuchs.

Among 18 cases of penetrating wounds of the bulb, which have been treated with conjunctival plastic, only one case of dubious sympathetic ophthalmia has supervened. The danger for sympathetic ophthalmia is decidedly not aggravated by the conjunctival plastic; 1 to 3 per cent of the cases of penetrating wounds of the eye are followed by sympathetic inflammation. When the traumatism is of such magnitude, that the vision is destroyed entirely and the bulb so soft that evisceration with sufficient certitude nor enucleation can be done well, the tabacsac suture made will facilitate greatly the enucleation a week later.

Conjunctival plastic should therefore be performed in nearly all perforating wounds of the bulb. E. E. B.

RESULTS OF CALLOSUM-PUNCTURE IN HYDROCEPHALUS WITH LOSS OF SIGHT AND OTHER DECOMPRESSIVE MEASURES.—MUSKENS, L. J. J., as guest of the ophthalmological society (*Tydschr. v. Gen.*, September 25, 1915), had investigated with Snellen an institution for the blind and found a large percentage of cases, where the not timely relieved cerebral pressure had caused atrophy of the papilla. It seems significant that the lumbar puncture, which has shown so dangerous to the neurologists, has kept its place in the ophthalmological clinic.

There ought to remain for the ophthalmologist and neurologists only the choice between the palliative trepanation and the callosum-puncture. The palliative trepanation, performed with dexterity produces a regular retrogression of the choked-disc (Sir Marcus Gunn and von Hippel). If a general surgeon or the ophthalmologist shall do these operations we must demand special neurological preparation. Unquestionably cases occur, where edema is present for months and years in slight degree, which does not lead to atrophy. They are, however, very exceptional. There are the acute and subacute edemas, which reach a certain height (4 to 5 D), which go on to atrophy and then only after that complete amaurosis, while from the other side these cases retrograde entirely after a well-done palliative operation. Neurologists think a direct indication for decompression, when an edema of 3 to 4D, does not diminish after a few weeks. They consider it not to be justified to wait till real diminution of vision appears, as then in most cases irreparable damage is already done.

Callosum-puncture does not produce disagreeable complications—M.'s personal experience is in accord with this—which cannot be prevented in all cases of palliative trepanation. It is the operation of choice for Hydrocephalus and analogous conditions. With a large cerebral tumor the ventricle cavity may become obliterated, so that even with an 8 to 9 cm. long canule no fluid can be produced.

If hydrocephalus appears in full-grown people the skull will as a rule not enlarge; examination of the hyperaesthesia of the sutures may then be of value.

E. E. B.

ON TRANSPLANTATION OF LENS AND EYE.—FISCHEL, A., Prag. (*Klin. Mon. f. Aug.*, 55, p. 528), reports on his experiments of transplanation of the lens into the connective tissue of the skin at any place of the bodies of larvae of salamandra maculata which live in water. The lens remains there for a long time, but gradually undergoes a retrograde or reversed development, a "retro-differentiation," by shrinking and disappearance of the lens fibers, leaving an epithelial vesicle similar to the lenticular vesicle of the normal development, which finally is completely absorbed.

This retrogression and absorption does not occur, if also the interior layers of the eye, especially the retina, are transplanted. From this follows that the lymph in the tissue of the skin is not able to serve as nutritive fluid for the isolated transplanted lens, and that the normal nutrient fluid of the lens in the eye must contain especial substances which, produced by inner secretion, reach

the lenticular cells from the retina and perhaps the cells of the intraocular tissues. These chemical substances are absolutely necessary for the preservation of the lens.

They also act as formative stimulations on the tissue cells of the place of transplantation, especially the epithelium of the skin, which is transformed by them, so that it gains the aspect of its former stages of development and may be compared to the corneal epithelium of the fully developed organism.

Thus these two kinds of retrograde development may be explained chiefly by trophic conditions without assuming a special tendency of retrograde development.

The facts, ascertained by these investigations, render it very probable that already in the embryo eye and lens produce and secrete substances, which play an important part in the development of lens and cornea.

C. Z.

OPTIC NERVE

ON PSEUDOGLIOMA AND PSEUDOTUMOR OF THE OPTIC NERVE IN INTRACRANIAL DISEASE.—GILBERT, W. (From the eye clinic of Prof. C. von Hess in the University of München (*Archiv. f. Aug.*, 80, p. 194), reports the clinical history and anatomical changes of the right eye, of a girl, aged $3\frac{1}{2}$, who, when 13 months old, had a heavy fall on the occiput. Three weeks later a paralysis of the right abducens was noticed, and six weeks later optic neuritis and amaurosis. The child was brought to G. on account of a yellow shine from the pupil and exophthalmus, which had developed three weeks previously. The eye was enucleated on account of possible glioma.

The anatomical examination revealed no tumor, but total detachment of the retina. The retina and a lighter, apparently very vascular, prepapillary tissue lay on the posterior surface of the lens; between retina and chorioid was a gelatinous exudation. The optic nerve was transformed into glious tissue, which indicated a connection with an intracranial disease, analogous to a case described by Finkelnburg and Eschbaum as pseudotumor of the brain.

The practical resume was: the diagnosis of glioma is not secured by unilateral exophthalmus, the other eye being intact. A pseudoglioma may be combined with a pseudotumor of the optic nerve, as optic neuritis and perineuritis, with intense phenomena of proliferation, may be added to a more or less insidious course of an

intracranial disease, with great probability belonging to serous meningitis often of uncertain etiology. C. Z.

ON PRIMARY TUMORS AND TUMOR-LIKE FORMATIONS AT THE OPTIC DISC.—OLOFF, H., Kiel. (*Klin. Mon. f. Aug.*, 55, p. 313). An otherwise healthy man, aged 22, was mustered for the navy in June, 1912. Half a year later he noticed that he could not see well with his left eye. As this became worse, he came to the hospital towards the end of 1913. V. 6/20 due to a swelling of the optic disc, which did not change within seven weeks. In April, 1914, V. was reduced to 1/30 eccentrically. A circumscribed greyish white, vascular tumor projected (6 D.) into the vitreous, the surrounding retina was slightly edematous, opaque, and showed very small white dots and radial streaks, probably the expression of folds of the innermost layers. Wassermann negative, no local tuberculin reaction. In spite of inunctions iodide of potash and tuberculin treatment, continued for months, the tumor grew and V. was only fingers at 1 m. eccentrically. As there was suspicion of a malignant tumor, the eye was enucleated in July. Since then, a year after the operation, no metastases occurred. Dr. Gilbert, München, to whom the eyeball was sent for anatomical examination, reported: the tumor, projecting 3 mm., showed a steep nasal and a flat temporal decline. The nasal portion was vascular, the temporal portion anemic. It extended to the lamina cribrosa and had a grey color. The microscopical diagnosis was sarcoma, the microscopical examination had to be postponed and will be reported later.

The review of literature shows that only four cases of primary tumors of the optic disc have been observed, aside of tuberculosis and lues, which are also rare. Characteristic of the described cases and the present case, was the lack of all external signs of irritation, while the tuberculous and the majority of gummatous tumors of the optic disc were complicated with more or less severe external irritation of the eye. Sarcoma seems to be the predominating form of primary tumors of the optic disc. They seem to be confined to youthful age and to be relatively benign, as never metastases were observed. The ophthalmoscopic and anatomical appearance of O.'s case are illustrated. C. Z.

TO THE TREATMENT OF TABIC ATROPHY OF THE OPTIC NERVE.—BEHR, CARL (From the eye clinic of Prof. L. Heine in the University of Kiel. *Klin. Mon. f. Aug.*, 56, p. 1), sets forth that cere-

bro-spinal lues is due to an infection of the meninges and its processes by spirochaetae, tabes and paralysis to an infection of the brain substance itself. The slight amenability of the two latter diseases to our therapy is attributed to the insufficient blood supply which renders impossible an all over equally strong concentration of the remedy, necessary for killing the spirochaetae, and to the peculiar behavior of the parenchymatous lymph current, which does not admit speedy neutralization and excretion of the toxins, formed by the spirochaetae.

B. considers the time in which the therapy begins in both groups of importance. Corresponding to the generally rapid development of cerebro-spinal lues the subjective ailments and symptoms set in at once and soon lead the patient to the physician. The reverse takes place in so-called metalues. Before objective or subjective symptoms appear, extensive degenerations have been established in brain and spinal cord. In the optic nerve this is typical, atrophy being the first symptom, while the functions are still perfectly normal. Hence the whole question of the curability of tabes or paralysis depends on the earliest possible diagnosis. B. found no other method for early diagnosis as reliable as testing the dark adaptation. The disturbance of dark adaptation is the first symptom of tabic degeneration of the optic nerve.

For illustration he reports a case in which after early diagnosis the process in the optic nerve was arrested by continued antiluetic treatment.

The clinical histories of four cases of tabic atrophy of the optic nerve are given in detail in which the specific treatment was followed by great impairment of vision. B. points out three types of tabic atrophy of the optic nerve in which an energetic antisyphilitic treatment is contraindicated: 1. Diminution of central vision, early loss of color-sense with normal or almost normal borders for white. 2. Intense concentric contraction, borders for white and colors coinciding, and normal or almost normal acuity of vision. 3. Slight disturbances of the visual field, more for white than colors, normal or almost normal acuity of vision, ophthalmoscopically marked atrophy. Intense photopsias.

In these types greater doses of iodine are recommended for stimulating the metabolism in general. In all other cases a specific treatment of the affection of the optic nerve is not only permissible, but, as the cases of the first part of B.'s article show, urgently indicated as energetically and persistently as possible.

B. had also good results with lumbar punctures evacuating 10 cc. of cerebro-spinal fluid during the energetic specific treatment, but considers a beneficial effect of endolumbar injections of salvarsan improbable.

C. Z.

ORBIT

BRUIT OVER THE EYEBALL IN EXOPHTHALMIC GOITER*.—RIESMAN, DAVID, Philadelphia (*Jour. A. M. A.*, April 29, 1916). About two years ago I saw a young girl with exophthalmic goiter. She had all the signs of this polysymptomatic disease, and as the vascular phenomena were especially well marked, it occurred to me to place the stethoscope over the eyeball, whereupon I heard a loud hum or bruit synchronous with the beat of the heart. When I saw her again some weeks later the sound was still present. As I had not heard or read of this sign before in connection with exophthalmic goiter, I naturally thought that I had made an original discovery. My belief was strengthened when I did not find any reference to it in any of the monographs on exophthalmic goiter. A deeper search of the literature, however, showed me that the sign had been discovered before, but had not found its way into even the most recent works on the disease. Dr. Barker¹ does not enumerate it in his comprehensive article in which he cites no less than thirteen eye signs.

Quite recently I saw with Dr. Westcott of Atlantic City a woman, aged 35, suffering from exophthalmic goiter. All the classical signs and symptoms of the disease were present, including a probable substernal goiter and pigmentation of the face. On placing the stethoscope over the eyeball, I heard the bruit most strikingly. Without telling Dr. Westcott anything, I asked him to listen. He heard the sound immediately and was much amazed by it.

The sound when present is easily elicited by placing the bowl of the stethoscope over the eyeball with the lids closed. At first one may be a little confused by a more or less continuous sound or hum which is evidently due to the muscular movements of the eyelids, but very soon one can make out the rhythmic murmur keeping time with the pulse. As I have intimated, the sound has been described by several writers. The first to notice it was Snellen, whose observation was reported by Donders. Duroziez heard a sound over the eye in exophthalmic goiter, but as he declared that the same bruit was audible over the normal eye, we must accept his own explanation of it: that it was due to the rotary movement of

the eyelids, hence not the sound in question. Hueter¹ spoke of a sound audible over the eye with the dermatophone, but as he heard the same sound over the temporal region and as he does not speak of exophthalmic goiter specifically, his observation is not germane to our subject. Schönfeld, in the course of a description of a single case of exophthalmic goiter, says, "On placing the stethoscope over the eye, a hum synchronous with the pulse could be heard." Carrington and Drummond also give clear descriptions of the bruit.

H. V. W.

PATHOLOGY.

THE CAUSE OF THE OPHTHALMOSCOPIC APPEARANCE IN AMAUROTIC FAMILY IDIOCY.—COATS, GEORGE, London (*Report of Ophth. Sect., Royal Soc. Med.*, February, 1916, *The Lancet*, Feb. 12, 1916). The writer in this paper deals with a contribution by Dr. F. E. Batten and Mr. Stephen Mayou on Family Cerebral Degeneration with Macular Change, in which those authors state that there is a close relationship between these cases and the instances of amaurotic family idiocy, the only difference between them being that the macular region in amaurotic family idiocy shows a much more marked oedema of the internuclear layers, and therefore a white area around the macula associated with a hole or thinning of the retina at the fovea due to oedema, their conclusion being that oedema of the internuclear layers was present in both diseases, but much more markedly in amaurotic family idiocy. In the present paper it was stated that for a histological study of the retina the material must be absolutely fresh, as post-mortem changes begin two hours after death: fixation must be perfect (Zenker's solution being the best), and the method of cutting must be suitable. Mr. Coats considered that in the retina, apart from the occurrence of oedema, the macular changes show marked differences in the two diseases, and these were enumerated. He repudiated the view which had been ascribed to him that the ophthalmoscopic appearance in amaurotic family idiocy are due to coagulation necrosis. Though the particular form of chromolysis, vacuolisation, etc., which characterize family cerebral degeneration closely simulates that which is seen in amaurotic family idiocy the underlying cause may be different; and the race selectiveness of amaurotic family idiocy should cause hesitation in identifying it with a disease which is not race selective.

C. H. M.

PHYSIOLOGY

THE LIGHTSENSE OF THE MAGGOTS OF *CALLIPHORA ERYTHROCEPHALA* (THE BLOW FLY).—(Illustrated).—WEVE, H., resumes the result of his elaborate and very interesting study as follows:

1. The curve of the lightsensitivity of the full-grown grubs of *Call. erythr.*, measured according to the flight-reaction in the arc-light-spectrum, shows great similarity with the curve of lightsensitivity of the dark-adapted or colorblind man, measured according to the sensation of luminosity. It corresponds with the curves of all the avertebrate animals examined by Hess.

2. Illumination decreases the sensitivity for successive weaker light stimuli, or even removes it. After a sojourn of a few minutes in the dark, or in weak light, the sensitivity returns. Therefore a light- and dark-adaptation exist.

3. The anterior part of the head segment (maxilla) possesses two pairs of sense-organs. Probably the most ventral is a smell-organ, the most dorsal an organ sensitive to light.

4. After removal of these organs sensitiveness to light cannot be demonstrated or hardly; it returns however after hours, or days. This may be explained possibly by the presence of a number of smaller sense-organs in the head segment, found near the larger ones.

In a footnote Weve mentions W. F. Ewald's recent investigations, which make a two color system probable for *Daphia pulex*. We should be careful in accepting that the avertebrate animals examined by Hess are entirely color blind. E. E. B.

CONTRIBUTION TO THE KNOWLEDGE OF THE PHYSIOLOGY OF THE LACRIMAL PASSAGES.—(Illustrated).—BENJAMINS, C. E., and ROCILAT, G. E. (*Tydschr. v. Gen.*, June 12, 1915), investigated the action of the winking on the evacuation of the tears. A regular tearsac is mostly absent (Merkel and Kallius; Aubaret); the entire lacrimal-nasal canal has in all its parts the same width and consists of a thick wall, in which cavernous cavities, filled with blood, form the chief mass, and a small, slitlike lumen. The superior part lies in a groove, formed by the lacrimal bone and ascending processus of the sup. max. and is called "sac;" the lower part enclosed in the bony canal is called "canal." Only in the minority of the cases the upper part is really so much wider, that one can speak of a sac. Towards the temporal side the sac is covered by the moderately thick lig. palp. med. stretched archwise between

both cristae. The ligament can be divided in two parts, an anterior running from the crista lacr. ant. toward the eyelid and a post. part, making an angle with the ant. of 120° , running straight backward, attached to the crista lacr. post. Both parts are strongly connected with muscular fibres. The anterior part forms a raphe from which the fibers of the *M. orbicularis* radiate fanlike. A direct connection of the *M. orbic.* with the sac itself does not exist. With the post. part of the lig. the soc. muscle of Horner is connected. This is a bundle of muscular fibres, which divides from the *M. orbic.* in the inner ocular angle and bends backward. Both canaliculi perforate this muscle. It inserts partly at the post. branch of the lig. pal. int. but for the largest part at the medial wall of the orbit, pretty far backward. Its direction of contraction coincides with the long direction of the sec-lumen, so that a dilating action is very improbable. Its chief insertion at the immovable wall of the orbit, is to be considered its fixed point, so that contraction would move the eyelid inward, which signifies compression rather than dilatation.

From anatomical data we conclude, that an increase in pressure consecutive to winking is probable.

Experiments first were done with rabbits. They possess a simple lacrimal canal. In the lower eyelid a large sac-form cavity is present, analogous to a very wide canaliculus. The only canaliculus has its outlet in the nasolacrimal canal without a separate tearsac. The upper eyelid has no canaliculus. It could be demonstrated that winking raises the pressure in the nasal canal. The same could be demonstrated in two men, one with a lacrimal fistule, the other with an opening in the nose from a West operation. One is not absolutely certain that the introduced tube in the fistule does not make own motions, as lying between the fibers of the orbicularis. If the tube was not well pushed in the results were changeable. The patient operated after West is free from these objections. The curved glass tube introduced in the nasal opening has not to pass a muscular layer and rests directly in the tearsac. The tube is filled with fluid. On closing the eye the line written by the winking raises and also the fluid-mirror surface. The pressure remains higher, until the eye opens, when a strong fall follows. The increase was always preceded by a negative fore-stroke. It seemed to result from a wider opening of the ocular slit preceding the closure with winking.

The possibility of pressure-increase, due to the anatomical rela-

tions of the muscles around the orbit has been mentioned. The widening of the sac with the concomitant decrease in pressure on opening the eye should be accounted for by the own elasticity of the tissues. The many blood vessels in the wall of the tearsac fulfill only the role of shock destroyer.

The writers consider, that anyhow the old theory of Arlt should be restored to honor, which says that winking produces a higher pressure in the tearsac.

E. E. B.

INVESTIGATIONS IN REGARD TO THE HEREDITY, PHYSIOLOGICAL AND PATHOLOGICAL CHARACTERISTICS OF THE EYE IN MEN.—WAARDENBERG, PETRUS JOHANNES (*Doctorate Thesis*), has divided his thesis of 238 pages into two parts: the first 120 pages is devoted to a full discussion of Mendelism, its history, value, the investigations made to test it, and the different hypothesis to explain it. The second part contains the writer's own investigations in which he made use of the material of the Gasthuis voor Ooglyders at Utrecht. He investigated the heredity of albinism, the coloration of the iris, the presence of hypermetropia, of astigmatism, and of atrophy of the optic nerve. He finishes with remarks about consanguinity and a short resume of the chief results.

Albinism is found sporadically in men, probably a little more frequently in the colored races than the caucasus. Direct heredity exists though rarely observed, collateral hypermetropia more often while consanguinity is least often. Albinism is attributed to the absence of a gen or feconditional factor which, in normal circumstances permits the pigmentation to become manifest.

W. collected 17 cases from the archives, 16 of which he personally examined. Twenty-four were cases of true albinism, 27 of semi-albinism. The vision of albinos is much reduced; nystagmus was always found to be present. The pigmentation form of the parents is without value as regards appearance of albinism. It seems not far fetched to accept the hypothesis, that albinism is due to the absence of a factor which helps in the formation of granular pigments. Eighty-nine children of normal parents were recorded of which 21 were albinos. To these are added the 14 albinos from 134 children by Plate, making 38 albinos in 141 children, or about 1:4 ratio, which is as one would expect when albinism is due to the absence of one *gen*. The absence of this *gen*, is recessive against the presence of it. In two cases consanguinity was observed. Heredity was not noted either direct or indirect. Weakness of the parents and sex have no importance. According to the hypothesis that an

albino must have been among the ancestors of both parents of an albino, it might follow, due to the recessivity of albinism, that the children of an albino might be normal. The question then arises, from where do the first albinos come? Heredity may not be taxed too much: an albino is not a racial but undoubtedly a pathological type. We must therefore account for the primary appearance by a loss-mutation, or through hereditary unequal partition in the germ-plasm, or through intoxication or unknown influences. This loss-mutation cannot manifest itself in crossing with a normal individual. When a gamete meets a similar from a family, where also such a mutation has taken place, then the R. R. combination arises and albinism becomes manifest. All children from a family of an albino and a normal individual are heterozygote and can in themselves or in their posterity be the origin of new albinos.

The color of the iris depends upon the pigment division. When the stroma contains little pigment and the retina pigment shines through we have a blue iris: when the stroma layers are thicker it is grayish. There are no sharp transitions between blue and brown eyes. The albinotic and the light blue irides have both a white vascular design. The yellow color seems to depend upon lipochrome. W. found without exception, that persons with clear blue (or grayish) eyes have children, all of whom have blue (or gray) eyes. In 28 such families there were 128 blue eyed children. Hurst examined 101 such cases making 229 children. He concludes that the blue (or gray) iris, i. e., that iris where the pigment is exclusively present in the retinal layers, bears a recessive character. He does it with more reason since he has found in the ascendancy of the parents different dark pigmented persons. It is preferable to speak of a duplex eye or an iris with ectodermal plus mesodermal pigmentation than a brown eye. Diffuse brown eyes, and ring-form brown and blue eyes with yellow-brown annulus minor, can possess, latent, the factor for blue eyes (simplex eyes). In 42 families, where one of the parents had simplex eyes, among the children 85 simplex eyes were noted. W. considers it not correct, that only diffuse brown pigmentations are homozygotes and all aureole forms as heterozygotes, because he does not know any instances of crossing of the same homozygotes producing different forms of intermediary types, while a non-proven but acceptable hypothesis is that all diffuse brown eyes are homozygotes. He concludes that the simplex (blue and gray) eyes have a recessive character. The darker irides are mostly dominating. Exceptional cases

should be explained through side-conditions (dihybridism, fluctuation, correlative). Different independent types of mesodermal eye pigmentation seem to occur, many of which seem to be practically heterozygote.

Myopia has not been specially investigated because myopia, although heredity is very evident, possesses a complicated character, certainly depending on more than one gen and needing probably some predisposing factors for development. It is a case of polyhybridism, therefore will inherit irregularly.

Hypermetropia is, in the highest types, most always microphthalmus. W. examined two cases where consanguinity was present. Among 35 families, of which one of the parents is hypermetropic (always more than 2 D.) and the other emmetropic, there were 174 children of which 79 were hypermetropic, or 49%. In 30 families of emmetropic eyes, out of 181 children 46 were hypermetropic or 26.5%. This speaks for a recession of the hypermetropia against emmetropia. In 15 families of mixed type 74 emmetropic children were noted, while in 4 families of hypermetropic type, of 24 children, all were hypermetropic. Sex does not play a part in transmission.

In astigmatism, heredity plays the same part as in hypermetropia. Astigmatism represents also a simple recessive quality, over which the normal corneal curvature dominates. The percentage of astigmatism in families of which the parents are normal is considerably lower than in families where one of the parents is astigmatic. Where both parents are astigmatic, all the children are astigmatic. Astigmatism and hypermetropia are simple qualities, hereditarily independent of each other.

Optic atrophy is studied in two forms, congenital and acquired. The acquired atrophy appears dominant while the congenital seems to be recessive—one could be inclined to think of the two species and formulate the following hypothesis in connection with the presence-absence of Bateson: the congenital form does not depend upon the destruction of normal optic fibres, as in the acquired form, but on aplasy or hypoplasia; the regression would then depend upon the absence or deficiency of the gen which influences the normal development: a gen must exist in the acquired form which could induce the formation of a noxious agents which would destroy the normally formed nerve fibres.

W. concludes as follows: (1) Total albinism is a hereditary recessive quality which manifests itself rarely (18 in some 160,000

patients). Albinism is not connected with refractive anomalies nor does it show preference for sex. Consanguinity can be the forerunner of albinism.

(2) The iris with ectodermal pigmentation is recessive toward that with ectodermal plus mesodermal pigmentation. Dark irides predominate slightly over lighter ones. Many independent types of mesodermal iris pigmentation exist.

(3) Hypermetropia is a recessive hereditary quality over which emmetropia predominates.

(4) Astigmatism is a recessive hereditary quality over which normal curvative dominates. Anisometropia is not a mosaic-like hybrid form. Hypermetropia and astigmatism are independently hereditary.

(5) Consanguinity is often prejudicial.

(6) Influence of sex has been observed only in a family of color blindness.

E. E. B.

THE POSITION OF THE EYEBALL IN THE ORBIT UNDER DIFFERENT PHYSIOLOGICAL CONDITIONS.—BARKAN, OTTO, San Francisco (From the eye clinic of Prof. C. von Hess in the University of München. *Archiv. f. Aug.*, 80, p. 168), reports his investigations on the physiological fluctuations of the position of the eyeball. In general he confined these to examining with the exophthalmometer of Lohmann the sagittal forward and backward movements of the eyeball, respectively vertex of the cornea, under physiological conditions, and especially the influence of the position of the head and of the local and general conditions of circulation upon them. In all 14 persons were examined. B. also describes his exophthalmometric experiments, which seemed suitable for contributing to the knowledge of the orbital outflow of blood. As the blood from the orbit flows as well backwards (cavernous sinus and jugular veins), as forwards (facial veins), he investigated, like Birch-Hirschfeld, the effects of compression of both outlets from the orbit.

His conclusions are: I. Enophthalmus occurs only under the following relations: (a) narrowing of the palpebral fissure; the factors are the gravitation of the upper lid and the contraction of the orbicularis muscle. (b) Near adjustment may in constant fixation and width of the palpebral fissure of the examined eye elicit enophthalmus to 0.2 mm. The contraction of the extrinsic ocular muscles is, as Tnyl indicated, to be regarded as effectual element. B. never observed enophthalmus in reclination of the head and deep inspiration, as claimed by Birch-Hirschfeld.

II. The influence of the gravitation of the eyeball (the gravitation of the orbital tissue and hydrostatic pressure of the orbital column of pressure act in the same sense), is very small in comparison to other elements causing protrusion. In the same sense speak the facts, that reclinaton of the head does not produce enophthalmus and that an existing intense protrusion is not increased by bending the head forward.

III. The augmentation of the orbital contents by venous congestion is of greatest importance for producing exophthalmus. This may be caused either by constriction of the outgoing passage or by the hydrostatic pressure acting in opposite direction. Whether a greater serous imbibition of the orbital tissue plays a part in these cases, is undecided.

IV. Unilateral physiological exophthalmus could only be observed by turning the head to the side and by unilateral compression of the jugular vein, but unilateral compression of the facial vein caused equal bilateral slight protrusion. From this follows that interorbital equalization of the venous pressure through the cavernous sinus is extensive but not nearly complete.

V. The influence of the position of the head upon the position of the eyeball is relatively small. The relation of the height of the head to the main mass of the body, i. e., the hydrostatic action of the general circulation is of determining importance.

VI. The efflux of the orbital blood occurs chiefly through the posterior passage (cavernous sinus and internal jugular veins). A relatively small portion flows forward through the facial veins. The relation of utilization of posterior and anterior outflow is independent of the position of the head, respectively body. C. Z.

THE INFLUENCE OF THE WIDTH OF THE PUPIL ON ADAPTATION.
—LOHMANN, W. (From the eye clinic of Prof. C. von Hess in the University of München. *Archiv. f. Aug.*, 80, p. 206), describes his experiments in which he compared the course of adaptation of one eye in maximal mydriasis, by homatropin and cocain, with that of the other normal eye of the same person after both had for 15 minutes been kept light-adapted by an electric lamp of 1,500 candle power. The curve of reciprocal treshold values of the mydriatic eye showed a retardation and did not reach the same maximum as that of the normal eye. L. concludes from his experiments that the disturbance of adaptation by mydriasis is due chiefly to the increased effect of light, i. e., only indirectly to mydriasis.

Vice versa in miosis by eserin one must consider a light protection compared with the normal control eye and one would have to expect an accelerated adaptation. The experiment, however, showed that the miotic eye is at a disadvantage against the normal eye, because, as L. explains, the pupil (by eserin), also miotic in the dark, transmits only a fraction of the physically exciting light. The curve showed a considerable reduction of the threshold values of the miotic eye.

Finally L. found that change of the width of the pupil of one eye had no influence on the adaptation curve of the other eye. This corresponds with the known phenomenon that the adaptation of one eye is to a large extent independent of that of the other eye and that a constant influence of the illumination of one eye upon the threshold values of the non-illuminated eye cannot be proven.

C. Z.

REFRACTION AND ACCOMMODATION

ANOMALIES OF THE ACCOMMODATION, CLINICALLY CONSIDERED.—DUANE, ALEXANDER, New York (*Arch. Ophthalm.*, March, 1916, XLV, 124), discusses both normal and abnormal accommodative power and presents a table of normal values of accommodation at all ages from 8 to 68, in which he gives the lower limit, mean value, usual upper limit, and extreme upper. He gives method of testing accommodation, and, under abnormal accommodation, he discusses insufficiency of accommodation, difficult or ill-sustained accommodation, inertia of accommodation, inequality of accommodation, and excessive accommodation.

A bibliography is added.

W. R. M.

REGULAR ASTIGMATISM OF THE CORNEA PRODUCED BY A TUMOR OF THE ORBIT.—VOGT, A., Aarau (*Klin. Mon. f. Aug.*, 55, p. 652). The right eye of a man, aged 20, was dislocated downwards and to the temporal side by a tumor, perhaps a dermoid, at the upper nasal portion of the orbit, which, as the patient stated, existed since early childhood and had gradually grown larger. The ophthalmometer showed a regular astigmatism of 3.50 with oblique axis of the right eye, the left eye was normal. The meridian of least curvature extended from upwards outwards to downwards inwards, the meridian of highest curvature in the direction in which the globe was dislocated. The diameter of the cornea from above outwards to down and inwards was 12 mm., that from above

inwards to down and outwards 11:25 mm. V. concludes that the slowly growing tumor not only crowded the eyeball down and outwards against the orbital wall (no exophthalmus was noticeable), but also changed its shape by compressive action. That the pressure did not produce an axial myopia is considered by V. as a new proof for the fallacy of the hypothesis of the eye-elongating effect of the pressure by some ocular muscles in near work. C. Z.

THE INFLUENCE OF PRESSURE OF THE EYELIDS ON ASTIGMATISM.—VERWEY, A. (*Tydschr. v. Gen.*, Sept. 25, 1915), has often noticed different values in the same patient, at different times, shortly after, and at the first examination a regular astigmatism, which later appears not to exist. Also such patients prefer a negative cylinder with axis horizontal, which later is rejected. Mostly these findings are done with nervous patients, especially if while examining the one eye the other is kept closed. Verwey found for himself, that closing one eye and pressing the other, especially with the lower lid, his vision would reduce to 0.4 and that this vision could be corrected by a negative cylinder of about -2 cyl. Axis horizontal. He could therefore accept, that this pressure enlarged for some two diopters the vertical curvature of his cornea. He could even, with some difficulty overcome a -3 cyl. through squeezing. Lifting of the upper or lower lid, that is lessening of pressure, made no essential change. Pressure with the finger on the lower lid makes a change, which can be corrected by a cylinder of some $-5D.$, although obscuration soon follows, which means a pressure of some 10 mm. Hg., whereby the retinal arteries become closed.

Pulling the lids at the external corner does not only increase the vertical meridian above the horizontal, but the entire bulb becomes flattened and so hypermetropic, so that cyl. $+3D.$ axis vert. produces full vision. V. has also been able to show with the ophthalmometer that a regular astigmatism can show through squeezing of the lids. He mentions that the pressure of the lids chiefly, if not exclusively, is exercised by the lower lid; a fact for which Straub put a suture through the lower lid with *extractio lentis*. We should therefore be careful in prescribing cyl. lenses for nervous persons.

Verwey examined 25 persons with different astigmatism in both eyes: pure pervers astigm. was absent 8 times; no difference in width of the eyeleft, 8 times; a small difference, 8 times, and 9

times distinct. The wider cleft was observed 8 times in the eye with the strongest regular astigm., in which the difference was distinct 5 times; the narrower slit happened 9 times in the eye with the most astigm., in which 4 times the difference was clear. In hypermetropes the slit is wider in the most astigmatic eye in 6 cases, against 3 times narrower. In the myopes the narrow slit happens 5 times in the most astigmatic eye and twice the wider.

Perhaps one may conclude with caution, that some regular astigmatics keep the congenitally most refracting eye wider open to make the difference smaller between both eyes; that in others, especially myopic regular astigmatics one eye slit is narrower or through squeezing, or through one-sided increased tonus, where-with stronger astigmatism is connected.

The influence of the pressure of the eyelids needs more attention than it has found up to the present time. E. E. B.

FUSION AN IMPORTANT FACTOR IN OCULAR EFFICIENCY.—SHEPARD, GEO. A., New York (*Jour. Ophthalm., Otol. and Laryngol.*, February, 1916). The author believes that fusion is not fully appreciated by ophthalmologists, and that it cannot be brought to normal by mechanical means alone. These patients have no proper conception of what constitutes binocular single vision, and this can only be inculcated by the suggestive influence of the oculist. Routine examination of the eyes should include a test of the strength of fusion. How many oculists do this? By the cover test some idea is gained by the rapidity of fixation by the eye uncovered. The cover test and the use of stereoscopic pictures are the two simplest methods of detecting weak fusion power. The patient must be convinced of the error of his ways. Show him by using a picture in the stereoscope, which he can fuse, the difference between it and one he cannot fuse. The author does not agree with the teaching that weak fusion centers can be strengthened only during child life. He reports one case, aged 43, and another of 54, who had very weak fusion power, who were completely cured by appropriate methods. His methods are to first get the patient in sympathy with his desire to improve the fusion faculty, then by the use of Worth's Amblyoscope, Wells' Interference Rod and the stereoscope much can be accomplished. In using the stereoscope find a simple picture which can be fused, then make fusion more difficult by use of prisms and then slip in a card that he has been unable to fuse and he will probably fuse it at once. A few lesions

and the patient can carry out the work at home, reporting progress from time to time until the asthenopic symptoms from faulty fusion have disappeared. M. B.

RETINA

DETACHMENT OF THE RETINA.—HIGGENS, CHARLES, London (*The Lancet*, Jan. 29, 1916). The writer relates his experiences with the operation of galvano-puncture as recommended by Paton. Both patients were soldiers who had met with the injury as a result of the bursting of shells, a large detachment resulting; in both instances the field became normal, the retina returned to its normal position and V. improved to J. 20 and J. 29 respectively at 1 ft. Higgs remarks that this operation is certainly the most satisfactory which he has ever tried during the 40 years in which he has tried every operation without the slightest good result: though galvano-puncture leaves much to be desired, it produces better results than any other procedure; in the cases reported there was improvement from a useless eye to sight sufficient to enable the patient to find his way about; these were cases in which the most favorable result might be expected, for in both displacement was caused by direct injury, in healthy eyes, and was recent. C. H. M.

CONCERNING THE SURGICAL TREATMENT OF RETINAL DETACHMENT.—THOMSON, EDGAR S., New York (*Ann. Ophth.*, Jan., 1916). The writer points out that medical treatment of retinal detachment is rarely, if ever, successful and that surgical treatment alone offers any prospect of success; such intervention has in view the removal of the subretinal fluid and the formation of adhesions between the retina and choroid. He mentions briefly the various surgical procedures which have been tried in the past. He believes that the attempt to secure adhesive inflammation to be of doubtful value since plastic formation in the retina is of such low grade that it is difficult to rely on this factor.

He accepts as generally conceded that scleral puncture has held its own better than almost any other surgical procedure, and it seems probable that the evacuation of the subretinal fluid is the correct principle upon which to build for the future. He points out that it is desirable not only to completely drain away the fluid so that the retina may fall back into position and the vitreous body be restored in volume, but also to secure more or less permanent

drainage so that reaccumulated fluid may not annul the effect of a previously successful operation.

The writer reviews briefly Holth's operation of trephining the sclera and his results, this operator crediting the technique of the operation to Argyll-Robertson in 1874, although the latter operated for absolute glaucoma. In eleven cases in which retinal rents existed, Holth obtained no permanent improvement, but in five cases without retinal rents the retina became completely reattached; in Holth's opinion the prognosis is most favorable in the flat detachment where a tear can be most reliably excluded. Parker reported eleven cases with very good results in three; vision was improved in four, unimproved in five, made worse in two; fields were improved in eight and made in two.

In September, 1914, Curtin of New York and the writer conceived together the idea of associating the trephine method with a simultaneous or subsequent aspiration of the subretinal fluid; the idea was to secure drainage over a prolonged period of time, and to remove the fluid with as little traumatism as possible, so as not to have any new inflammatory tissue around the scleral opening which might subsequently block it up. The technique followed in 13 cases recently reported was practically the same as Holth's, except that the scleral opening was never enlarged with scissors. "A scleral button is removed with the slightest possible traumatism, as nearly over the center of the detachment as possible. If supra-chorioidal fluid escapes in any great quantity, and the ophthalmoscope shows that the detachment has gone down, the conjunctival flap is replaced and nothing further done for the time being. If little suprachorioidal fluid escapes, the needle of an aspirating syringe is carefully pushed through the chorioid and as much fluid as possible is aspirated. The conjunctival flap is then sutured into place and the operation is terminated. If no aspiration has been done at the time of the trephine operation, it is done about ten days later when the reaction has completely subsided. A small aspirating needle is passed through the conjunctiva, the scleral opening and chorioid, and as much of the fluid as possible is withdrawn. This operation can be later repeated if necessary, as it is followed by almost no reaction, and, as before stated, it accomplishes the removal of the fluid with the least possible traumatism of the chorioid in the trephine opening. We feel that any escape of vitreous, or wounding of the retina, is undesirable, as

such a condition must certainly lead to adhesions and more or less blocking up of the permanent filtration."

The conjunctival flap is sutured at its summit; a 2 or 3 mm. trephine is used, care being taken not to injure the chorioid; in aspirating the retina must not be punctured with the needle, which must be carried well back and kept as close to the chorioid as possible, remembering that through the pupil the detachment seems much nearer the observer than it actually is, on account of the refraction; as the fluid is removed the retina falls against the side of the needle, as can be observed by an assistant with an electric ophthalmoscope, which is not difficult through the dilated pupil; aspiration to be effective must remove practically all of the fluid; the reaction following the operation is slight and that following aspiration depends somewhat upon the amount of fluid withdrawn, being greater the greater the amount of fluid removed.

The idea has been to get rid of the suprachorioidal fluid primarily and secondarily to forcibly aspirate the subretinal fluid as completely as possible, so as to allow the retina to reassume its normal position; the filtration through the trephine opening may then prevent more fluid from accumulating and forcibly separating the retina from its position secondarily. Since detachment of the retina leads to degenerative processes with thickening and contraction of the detached area with shortening, the writer advocates the early removal of the fluid before these degenerative processes have begun and before the light perception has become much diminished.

In high degrees of myopia, whatever the cause of the detachment may be, the lack of extensibility of the retina makes such an operative procedure as is at present under discussion of very doubtful advantage. Holth considers that the trephine opening allows a certain amount of shrinkage of the eyeball, and mentions two cases in which trephining was done in high myopia without any detachment being present, simply in order to reduce the refraction, which, he says, was successfully accomplished.

In discussing the results, the writer emphasized the fact that no result can be considered of much value unless by far the greater part of the retina is completely reattached; if anything but a very small area around the trephine opening remained unattached, the recurrence of the detachment was fairly rapid; in all the cases operated upon encouraging improvement was secured at first, but no result of value ensued if a detachment of any size remained; the retina must be almost completely reattached to obtain a valuable

effect. In three cases in which the detachment was recent, good results were obtained; in the remaining 13 cases, all old and some with high myopia or old inflammatory changes, no results of value could reasonably be expected and none were obtained. C. H. M.

TUBERCULOSIS OF THE RETINA, RECURRING HEMORRHAGE AND RETINITIS PROLIFERANS.—JACKSON, EDWARD, Denver (*Ann. Ophthalm.*, January, 1916). Recurring hemorrhage into the retina and vitreous in young persons has been hard to account for, but during recent years our acquaintance with the condition has been extended and improved by careful, prolonged ophthalmoscopic study of the fundus at such intervals between the hemorrhages as visible portions of the retina could be seen. The result has been the recognition repeatedly of a definite series of fundus changes. This, together with the observations on the coagulability and cytology of the blood and the blood pressure, have tended to negative the suppositions of general hemic or circulatory disturbance. Meanwhile the specific tests for syphilis and tuberculosis have given valuable evidence as to the presence or absence of these specific diseases. He reports two cases in young women where the fundus changes were obscured by vitreous haze and membrane, which finally became interspersed with spots of hemorrhage, exudate and newly formed vessels. Tuberculin caused general and focal reactions and its use over an extended period seemed to be productive of an arrest of the disease, but not until retinitis proliferans has wrought great damage to vision. M. B.

CONCERNING THE SURGICAL TREATMENT OF RETINAL DETACHMENT.—THOMPSON, EDGAR S., New York (*Ann. Ophthalm.*, January, 1916). The author has not found the slightest measure of success in any form of medicinal treatment. After having tried the various operative procedures with indifferent success, he feels that in scleral trephining he has had better results than by any other method. A spot is selected for operation which is as nearly over the height of the retinal detachment as possible. A flap of conjunctiva and capsule is raised and a suture passed through these tissues to hold them together so that they may be replaced together over the trephine opening in the sclera. A trephine is used with a diameter of 2 to 3 mm. There is often an accumulation of fluid between the chorioid and the sclera which escapes at once. The fluid between the chorioid and the retina may be withdrawn at once through a needle attached to an aspirating syringe, or this part of

the operation postponed for about ten days. If the latter is decided upon the flap is replaced and sutured and when the reaction has largely subsided the needle is thrust through the flap and scleral trephine hole and chorioid and passed backward as close to the chorioid as possible, so as to avoid puncturing or damaging the retina. If the retina plugs up the needle it must be freed. An assistant with an electric ophthalmoscope watches the action of the retina through the dilated pupil. All the fluid must be withdrawn. If any is left it probably will not be absorbed and may encourage the formation of more. Subsequent passage of the needle for the withdrawal of fluid can be done if indicated. The successful cases are those in which there are no retinal rents and where the retina has not been long detached. M. B.

RETINITIS EXUDATIVA.—ZEEMAN, W. P. C., shows a patient suffering from this disease. Cornea, iris, lens and vitreous without changes. The retina shows a peculiar discoloration, reminding one of Berlin's edema and some forms of metastatic retinitis: it is limited to one vascular region, combined with white streaks, which arrange themselves in the macular region in a star-figure. This leads one to suspect a serofibrinous infiltration of the retina. In different parts of the retina vascular changes are seen: narrowing with the grayish or white bands, which accompany them and which in the temporal side must belong partly to miliary aneurysmata: chiefly the veins are affected. Peripherically below, irregularly dispersed behind the vessels and before cream white formations. Pat. has no other changes, has a weak Pirquet.

RETINITIS EXUDATIVA; ARTERIA OPTICO-CILIARIS; CYST AND BEGINNING FORMATION OF A HOLE IN THE MACULA.—VAN DER HOEVE presents a patient with these changes. The man, 24 years old, was accepted for military service in June, 1911, and is in the army again since November, 1914. In the beginning he had no trouble from his eyes. In October, 1914, he began to have trouble with his vision and in November the O. D. began gradually to fail. He comes from a healthy family of ten; he was operated as child for lymphnodes in the neck. June 12, 1915, V. O. S.=6 6; V. O. D. fingers at 1 4 M. O. S.=N. The anterior part of O. D. is normal, vitreous clear. A mass toward the nasal side of the disc about two disc diameters large, slightly elevated (2 to 3 D.) with gray-greenish color; the surface reminds one of oil drops; distensions go from it around the papilla, which surround it entirely except for a small

part above the disc. To the nasal side of these distensions lies a hemorrhage beneath the vessels: above the mass is a similar one. The retinal vessels are normal: the A. ret. temp. sup. gives off a branch just after leaving the disc, which curves with the concave side turned toward the pupilla, and after giving off a very thin branch in the retina disappears at the disc margin. In the up-right image the macula lutea shows as a very thin, sharply defined, polygonal membrane. Behind this are three pigment-spots and in the lower part a browned mass, apparently an old hemorrhage in a cavity behind the macula. This mass shows marked parallax displacement and lies 4 to 5 D. deeper than the macula. The retina at that place slightly bombates and appears as a very thin film, which may burst at any moment. Temporal to the macula is a deep lying dilated vessel, still farther a light greenish tinted pigment spot. In the periphery many smaller grayish-white foci, all in the deeper layers. The haemoglobin percentage of the blood is 90 to 100%: number of red and white cells normal, no abnormal cells: clotting time normal compared with two controls (method Nolf and capillary-tube): pressure 122 (Riva-Rocci). Urine: N. Wass., pirquet, tuberculin test: neg. A strong argument for vascular origin is that pretty often similar abnormalities are found in old people with arteriosclerosis. The retinitis exudativa or haemorrhagica externa could be properly divided in a juvenile form ("Coat's disease"), which mostly originates before the thirtieth year and a senile form caused by arteriosclerosis. This case shows as a congenital deviation, the very rare picture of a true art. optico-ciliaris (one more case is known according to Leber, by Oeller): after pressure the vascular curve fills from out the art. temp. sup.

E. E. B.

SINUSES, NOSE AND EAR.

OCULAR TUBERCULOSIS OF NASAL ORIGIN.—LUEDDE, W. H., St. Louis (*Ann. Ophthalm.*, January, 1916). He has noticed for years the frequency with which ocular tuberculosis follows so-called "colds." The nasal sinuses have been found to be the situation of the tuberculous infections. A tuberculin test causes a focal reaction in the sinuses involved and in the ocular lesion. Almost invariably the nasal and ocular lesions are on the same side of the head.

One case is reported at great length in which small doses of

tuberculin were not well tolerated and complete exenteration of the sinuses had to be resorted to.

The author feels that where the ocular lesion is not responding rapidly to the administration of tuberculin that the nasal sinus or sinuses involved should be dealt with surgically. He has found this to be necessary in several cases.

He looks upon the nose as a fertile soil for tuberculous infection and that the eyes become infected through the lymph and blood channels. Unless it is borne in mind to watch for nasal reactions from test doses of tuberculin, they will be overlooked. He thinks that is the reason why they have not been more frequently recognized.

M. B.

FUNDUS CHANGES IN SUPPURATIVE INTRACRANIAL DISEASE OF OTITIC ORIGIN.—CLAY, J. V. F., Philadelphia (*Jour. Ophthal., Otol. and Laryngol.*, February, 1916). Fundus changes in intracranial suppurative disease of otitic origin are usually more constantly observed in otitic meningitis, less frequently in sinus thrombosis and cerebellar abscess and frequently in cerebral abscess. In otitic meningitis the fundus changes noted vary from single engorgement to papillitis, choked disc or optic neuritis. If the cavernous sinus is involved and a septic clot forms, there will be loss of corneal sensation, proptosis, conjunctival and lid oedema and immobility of the globe. In brain abscess fundus changes are exceptional and papillitis is more often observed than neuritis. When the abscess has existed for some time the continuous pressure is more likely to cause the same optic nerve symptoms observed in brain tumor; namely choked disc, and this symptom is more likely to arise in cerebellar than cerebral abscess.

M. B.

SYMPATHETIC OPHTHALMITIS

THE PROGNOSIS IN SYMPATHETIC OPHTHALMIA.—DUNN, PERCY, London (*The Lancet*, March 18, 1916). The author thinks that the term sympathetic ophthalmia should be relegated to the past, as every ophthalmologist has agreed that the disease is not due to sympathy but to a process of infectious origin. Although the micro-organism which is responsible for this condition has not been identified, the author thinks there is no reasonable doubt about the existence of such a micro-organism. Failure to isolate it may be due to imperfection of bacteriological technique. The writer suggests the term "infective cyclitis" or "infective ophthalmitis." Ev-

idence of infective origin is found in the increasing rarity of sympathetic ophthalmia, as aseptic and antiseptic principles in wound treatment are being lived up to more and more. Enucleation of the injured and infected eye acts prophylactically by removing the source of the infection. Sometimes the infective signs have appeared in the sound eye some days after enucleation. When this occurs, we may logically assume that the blood has already been charged with the toxin from the infecting eye, and any symptoms of the disease arising after the enucleation may be attributed to this cause. The term sympathetic ophthalmia must be misleading to students in that it gives a wrong impression as to the causation of the disease. The author suggests that in all future text-books on ophthalmology the subject should be discussed solely from the infective point of view. Sympathetic irritation and sympathetic inflammation are not separate diseases, but less severe and more severe manifestations of the same condition, varying with the virulence of the toxin to which the morbid effects are due. The probability is that the real line of successful treatment in these cases lies in the discovery of a vaccine.

J. M. W.

TUMORS

TO THE KNOWLEDGE OF EPITHELIAL TUMORS OF THE CORNEA.—STEINOHRT, J. A. (From the eye clinic of Prof. A. Peters in the University of Rostock. *Klin. Mon. f. Aug.*, 55, p. 325). gives after a review of literature the anatomical description of a large, most likely primary, basal-celled epithelioma of the cornea. C. Z.

ON INVOLUTION OF GLIOMA OF THE RETINA.—MELLER, J. (From the eye clinic of Prof. E. Fuchs in the University of Wien. *Centralblatt f. prakt. Aug.*, 39, p. 101). The right eye of a boy, aged 4, showed a typical glioma of the retina. The parents stated, that since birth this eye deviated outwards and that they had noticed a grey reflex from it, which in the last few months has assumed a yellow shine. Tension normal.

The examination of the left eye also revealed three typical gliomatous tumors and the lower retinal vessels very much thickened and tortuous.

After two weeks the right eye became very painful and glaucomatous and was enucleated. It presented the typical aspect of glioma exophytum. The retina was totally detached and touched the posterior surface of the lens. The tumor partly filled the sub-

retinal space. The retina was converted into gliomatous tumor. From the subretinal tumor numerous particles had been disseminated upon the surface of the chorioid, where they had begun to grow. The whole uveal tract was atrophic, and the optic nerve was excavated and atrophic. The outer capsule of the eyeball was intact.

After a year the condition of the left eye was the same, but after further six months the tumors seemed to be larger. M. did not see the child for three years, when it was brought again for examination. The right orbit, which had remained free from relapse contained a well fitting prothesis. The left eye had normal vision, the retinal vessels were of normal size, the retinal foci had the same form and magnitude, but had become flat and resembled discolored chorioidal foci, except that they were composed of white masses like lime. There was no doubt about the correct diagnosis, so that the benign course of a real glioma within five years cannot be disputed. M. considers it as an involution, but does not speak of healing of the glioma, as it is out of control, whether living tumor cells may have remained, which suddenly may give rise to a rapid growth. He attributes the favorable course not to radiation with Roentgen rays, which had been applied twice, but to an unknown factor, which in very rare cases leads to the extinction of the neoplastic process, even if the disease has been far advanced.

C. Z.

CARCINOMA OF THE PALPEBRAL CONJUNCTIVA AND CORNEA BY CONTACT.—EYMANN, L. (From the eye clinic of Prof. A. Peters in the University of Rostock, *Klin. Mon. f. Aug.*, 55, p. 339), gives the clinical history and microscopical examination of an epithelioma or basal-celled carcinoma of the upper lid of a man, aged 82, which started from the conjunctiva of the intermarginal seam. The corresponding surface of the globe presented a marked carcinomatous exuberation of the corneal epithelium and the adjoining epithelium of the conjunctiva. The changes of the cornea and limbus were well circumscribed, so that a transmission of the carcinoma by contact was most probable, especially as the sections of the tumor of the upper lid showed towards the fornix a marked encapsulation by connective tissue, which spoke against a migration of the carcinomatous process along the mucous surface to the retrotarsal fold and from there to the anterior surface of the eyeball. The tumor of the lid exerted an intense pressure on the corresponding part of the ocular conjunctiva and cornea and a subsequent very

close contact of both surfaces, by which a transport of elements of the tumor took place. Also at the maxillary angle a basal-celled carcinoma was found, probably a metastasis. Five similar cases and 16 cases of carcinoma of the palpebral conjunctiva are quoted from literature, which shows that they are very rare. C. Z.

VISION AND COLOR VISION

LUMINOSITY OF THE COLORS.—(Illustrated.)—LIENEMAN, JAN ERNST (*Doctorate thesis*), brings in his introduction Donders' classical findings; his book of 198 pages is divided into 12 chapters, the conclusions of which are given below as it is impossible to condense this work in a few pages.

The intensity of a light is the quantity of energy which that light represents or, rather, the incitation-value of that light for a physical energy-meter.

Change in the intensity gives for the observing eye change of impression in luminosity.

This luminous impression appears also to change by changing the wave-length of the observed light (while the intensity does not need to change in that degree or even not entirely).

Each light of a distinct wave-length has therefore besides the common value for our luminous impression, determined by the quantity of energy, a specific one, depending on the form (wave-length), under which the energy is absorbed by the eye.

The luminosity of a light is the total incitation-value (determined by the mentioned common and specific components) of that light on our luminosity-sense.

This luminosity-sense can be described as the power to distinguish in our light sensation the factor common for all wave-lengths, only variable quantitatively, which value is dependent on the source and form of the light-energy, and also remains as sensation, when the other factors as color and saturation disappear.

By keeping the source constant we are able to judge with different wave-lengths the specific incitation-value of the different forms, under which the light appears.

Taking a distinct quantity, Na.—light-energy=100, we are able to determine for different eyes the relative incitation-sensitiveness for spectral lights without mixing their color-sense, which has great importance for understanding color blindness, color weakness, etc.

The relative values are sufficient practically at present—although they can be transposed into absolute ones by subtle experiments on minimum perceptible and minimum variable of the standard-wave-lengths (mostly Na-line) together with energy-measurements along the entire spectrum. A difference appears in luminosity observations with day and twilight, which depends on the different sensitiveness of the cones and rods, the first of which functionate with strong, the last with weak light.

Luminosity experiments with weak light cannot give results for our vision with light adapted eye.

Observation with luminosity experiments must therefore be done by the cones and clear light spectrum. It appears, that color and saturation thwart our luminosity observations, so that "heterochromous photometry" is an unreliable method.

At the same time the question arises, if the "color" and the "luminosity-impression" can influence each other, or are only confused in our observations.

The most satisfactory of the methods of luminosity-observation is the one of the "periphery-values." The others are based partly on a wrong principle, partly they are too indefinite for giving good results. The experiments with "peripheric sight" are based on the observation with cones of the periphery, which produce there the sensation of luminosity but not of color.

The result is, that luminosity and color do not influence each other. Functions and reflexes are present in our eye, which indicate with more or less perfection the quantity of spent light-energy.

Although it is not sure, that they indicate the entire quantity, nor a fixed part of the consumed light-energy, they still possess great value in careful experiments with well-informed people.

The results equal the "periphery-values" pretty well.

The result of the luminosity experiments for trichomatrics is oscillating, especially in the direction of the green-anomalies.

The red-and green blinds have constantly repeating typical deviations (a shortage in their weak color).

The red-weak-ones possess a deviation, corresponding with that of the red blinds.

The green-weak-ones possess a deviation corresponding with that of the green blinds and of some trichomatrics.

Both these last sorts are little investigated; also investigation of the causes of the oscillations among the trichomatrics is desired. The motive for own experimentation is found in three questions:

1. How is the excitation-sensitiveness of the color-weaklings?
2. How must be explained the luminosity-oscillations among the trichromatics?
3. Can a conclusion be drawn about the character of the defects of the color sense?

The visual acuity is taken as measure of the incitation-sensitive-ness in the experiments. As absolute exactness cannot be reached a somewhat ruder method is followed, which allows examination of many persons. The results will prove not much different from those of other experimenters. The luminosity-numbers divide the examined into two groups, the first comprises trichromatics, green weaklings, green blinds and old aged people, the other red weaklings and red blinds. The first group must be divided in two sub-groups: True-color weaklings and chromatics, who all have a quantitative deviation of luminosity, or through a yellow lens or through increased foveal absorption, reflex or fluorescence to the disadvantage of the blue-green part of the spectrum.

The trichromatics, who as regards excitation-sensitiveness ought to keep midst between the two groups of color weaklings (-blinds), are pushed toward the side of the green anomales (-blinds) through the yellow of the lens in older age and through the reflex, absorption or fluorescence of the macular region. They do not have a defect in color sense, although a much displaced trichromatic can make an observation with very small foveal-fields, as a green anomalous.

It appears from luminosity-experiments with colored fields of foveal and hyperfoveal size that all anomales possess with a shortage in luminosity a shortage in purity. They differ in this from the trichromatics with simple deviating luminosity division. This is a typical deviation for the light from the blue side of the spectrum, because it reaches the retina in smaller quantity, without one distinct principal color having a tendency to fall back quickly in a neutral (color weakness). The increased luminosity of the anomales in the non-concerned colors must be explained partly by a reduction of the measure-unit (brightness of the white-black scale), but perhaps also because the less sensitiveness for the one factor has found its equilibrium in a greater sensitiveness for both the others. The dichromatics are inferior to the color weaklings in color-intensity, but hardly in excitation-sensitiveness. The color weaklings also show the foveal color-deviation.

The generally recognized facts lead to accept difference in func-

tion between rods and cones, to reject Hering's theory about the "white-values" to separation of green blinds (-weaklings) and red blinds (-weaklings), to reject influence of color on luminosity impression, to recognition of the "color" as a more specified differentiating of the simple "white." The question if the loosing of the colors in the periphery is of the same value as the becoming colorless through combination seems to need an affirmative answer. The theories show in general a tendency for v. Kries' zône-theory or Fick's moving's-theory.

Luminosity determination has a high value, often more than color determinations. But they must be done representing the physiological and psychical examination methods.

The construction of exact instruments for luminosity determination is desirable, in which especially the unit for excitation-sensitiveness should be chosen pure. E. E. B.

THE EXAMINATION OF THE COLOR SENSE WITH A SIMPLE COLOR FILTER.—ROCHLAT, G. F. (*Tydschr. v. Gen.*, July 24, 1915), described how one can have all saturations of green and red, with their mixture, using only one fluid, by changing the thickness of the layer.

Green anilin dyes in solution show a green spectrum with a small band of the extreme red and a large quantity of blue. In sufficient concentration no yellow passes through. The blue can be eliminated by mixing a yellow dye with the fluid. The best is pyoktaninum aureum. The spectrum of this mixture with an Auer-light shows only two colors: a small band in the extreme red and a larger one in the green and blue-green. These are just the colors, which give trouble to the color blind.

If one looks through the fluid in a cuvette at an Auer-light, which is made diffuse by a positive lens and milk glass, this will look green, and red if the layer is thicker. It must be possible to find a thickness of layer, where quantities red and green pass, which neutralize, and so form white. (The fluid is seen colorless for Auer-light with a 5 cm. thick layer, if the composition is taken as follows: 150 cm.³ water 3 cm.³ 1% methylgreen of Grubler, and 2 cm.³ saturated aqueous solution of pyoktaninum aureum of Merck, to which 3 drops acid. acet. glaciale are mixed.) The fluid was put in two glass prisms, which put with the slanting sides against each other form a parallelepipedon. By moving both troughs parallel to each other a layer of any desired thickness can be got with always parallel surfaces. The troughs are placed on

a table at the height of the eyes of a sitting person. Behind them is a black, vertical screen with an opening of 5 cm. diameter, which can be regulated by an iris diaphragm. Behind this opening is first a lens of 5 D., a milk glass and an Auer-light, which can be moved along a ruler and the relative distance of which can be regulated, so that the screen opening is diffusely and illuminated as strongly as possible. One of the troughs is immovable, the other moves by turning a knob. Sitting before them one sees a bright illuminated disc: going out from green, this becomes slowly less saturated, more mixed with white, then clear white, and after that reddish up to spectral red. By measures on the sledge the thickness of the fluid layer can be read.

Different observations can be made with the instrument. *Primo* the resorption of green in the yellow spot can be demonstrated. By making the opening of the irisdiaphragm small the chromatic aberration in the eye can be demonstrated. It is useful in examining the central color sense. The patient sees first a colorless field of certain size, regulated with the iris diaphragm; this field is now changed regularly in an increasing saturation of red or green and the saturation, at which the patient first notices color, is observed. A patient, who had suffered from a one sided inflammation of the optic nerve, and was cured with normal vision and who showed no difference between both eyes examined in the usual way perimetrically and with color discs, proved to need a layer of 2 mm. more thickness with the color filter for the before-affected eye, which gives a pretty important difference in saturation. Congenital color disturbances can be readily detected. Directly an idea can be made of the more or less capacity for recognizing signals: the saturation of green, resp. of red, which they do not recognize is found directly. It shows, which the methods of Holmgren and Stilling do not, that in old people a certain saturation of green is seen as white and that they would neglect under favorable circumstances a signal pointing to cautiousness.

An objection to putting the results in cyfers is the insufficient stability of the aniline colors. The solutions of methylgreen lose very soon in coloring power even if light and air are locked out. Weekly acidifying with acet. acid makes the solution only stable for a few weeks longer. For every amount of color the most desirable concentration must be sought. Therefore the cyfers, found with different fluids, are incomparable.

E. E. B.

THE BEHAVIOR AND DIAGNOSTIC IMPORTANCE OF DARK ADAPTATION IN THE VARIOUS DISEASES OF THE OPTIC NERVE. 1. PART. THE DARK ADAPTATION IN OPTIC NEURITIS AND CHOKED DISC.—BEHR, CARL (From the eye clinic of Prof. L. Heine in the University of Kiel. *Klin. Mon. f. Aug.*, 55, p. 193), studied for more than six years on thousands of cases of dark adaptation of the eye and ascertained its great practical value for ophthalmology. The most useful and simple apparatuses are those of Nagel and Piper, by which the least quantity of light is determined, that is just perceived by the patient. The less this is, the greater is the sensibility of the retina, since quantity of light and sensibility of retina are in reciprocal relation. Normally the sensibility of both eyes is perfectly equal, so that striking differences indicate a pathological process.

Pathological influences alter the dark adaptation in two fashions: the characteristic development of the increase of sensibility, the phase of the rapid rise being abolished, and the maximum of the sensibility. Practical experience showed that the numerical, resp. graphic, demonstration of the increase of sensibility, i. e., the development of the function, may be disregarded for the purposes of clinical examination, as it is subject to greater physiological fluctuations and no proportional relations exist between its initial and terminal values. After the maximum of sensibility is reached, the function of dark adaptation is closed in itself and, thus isolated, is adaptable for examination. The maximum of sensibility in normal and pathological eyes is reached at the latest after remaining three-fourths of an hour in the dark. If it is normal after this time, normal function may be assumed, even if the initial value or the mode of increase of sensibility should deviate from the normal type. Thus the value of function may be expressed by one number. From very numerous investigations B. considers 1,500 units of sensibility after three-fourths hours in the dark as the lower normal limit. Cases with less than 1,000 units are pathological. The dark adaptation and its underlying anatomical processes are not to be considered as local changes confined to the retina, but take place under the regulating influence of a higher nervous center, most likely in the lateral geniculate body, as B. found in relative homonymous hemianopsia (basal and intracerebral). All processes, acting more mechanically on the optic nerve and the basal visual path (tumors, hemorrhages, internal hydrocephalus, traumatism, choked disc, etc.), damage vision, visual field, and color

sense much more than dark adaptation. On the contrary inflammatory and especially chronic degenerative processes intensely lower the dark adaptation, while the other visual functions are not at all or considerably less impaired.

The behavior of dark adaptation in the single groups of affections of the optic nerve is set forth in connection with the clinical histories of six cases of optic neuritis and seven cases of choked disc. From these follows the great value of disturbance of dark adaptation for the diagnosis of optic neuritis with and without ophthalmoscopic changes as its most constant symptom. B. shows how the disturbance of dark adaptation, most likely due to the action of toxic products on the apparently very sensitive centrifugal fibers, varies in the different stages of the disease, and its differential diagnostic value in distinguishing neuritis from pseudoneuritis. In cases in which the discrimination of optic neuritis from choked disc is not possible, the examination of dark adaptation may be able to fill this gap.

In the first stage of papillitis the dark adaptation is undisturbed, in the 2nd, if the papillitis develops rapidly, the dark adaptation is impaired, if it developed gradually, it may be normal or very slightly decreased, as in the 3rd stage. The difference between the generally low vision and intense contraction of the visual field on the one side and the normal dark adaptation on the other is very striking and characterizes the different powers of resistance of both groups of visual fibers against mechanical injuries. C. Z.

WAR EXPERIENCES ON HEMERALOPIA AND BACKGROUND OF THE EYE.—AUGSTEIN, C., Bromberg (*Klin. Mon. f. Aug.*, 55, p. 474). reports his observations on 19 hemeralopic persons, mostly soldiers, returned from the war zone. The tests were made with a radio-active dial of a watch, according to the recommendations of Braunschweig and Best. All were examined ophthalmoscopically in mydriasis with euphthalmin and cocain, which revealed chorioiditic changes in a so far not known extent.

Three distinct groups of chorioiditic changes were ascertained: 1. Changes similar to the peculiar hemeralopia with diffuse greyish white discoloration of the fundus, described by Oguchi, almost always associated with amblyopia. 2. Black round patches and thick streaks. Otherwise the fundus was normal or showed small white dots and streaks, or typical trigonal depigmentations, with the base towards the periphery and a dark round spot at the apex, or oval. 3. A picture similar to atrophy by ectasia in myopia.

Although errors of refraction occurred frequently, A. does not consider them as an etiological factor of hemeralopia. In none of the cases were signs of recent inflammations; the chorioiditic changes gave the impression that they had existed for a long time. Hence it was more probable, that external influences elicited the defective adaptation in the predisposed chorioid.

A. explains the affection by disturbances of nutrition in the choriocapillaris, and concludes from his observations: 1. That in a large number of so-called idiopathic hemeralopias or hemeralopias from disturbances of nutrition chorioiditic changes are present. 2. That in hemeralopia characteristic changes of the fundus, aside of the so far known—the cases of the first group.—are encountered, and 3. that a chorioiditic alteration, even if not characteristic, may support the diagnosis. 4. With great probability changes of the fundus of a certain kind, which mainly consist in a focal discoloration of the pigment epithelium and do not entail a functional disturbance by themselves, furnish the predisposition to hemeralopia.

C. Z.

THE BEHAVIOR AND DIAGNOSTIC SIGNIFICANCE OF DARK ADAPTATION IN ATROPHY OF THE OPTIC NERVE.—BEHR, C. (From the eye clinic of Prof. L. Heine in the University of Kiel. *Klin. Mon. f. Aug.*, 55, p. 449), describes his observations on dark adaptation in atrophy of the optic nerve under two groups, illustrated by clinical histories, viz., descending and progressive optic atrophy. The first group develops from a retrobulbar focus due to inflammatory processes, chronic intoxications, disturbances of nutrition, direct injuries and compressions of the nerve. The ophthalmoscopic picture alone does not indicate which of these causes exist, but the disturbance of dark adaptation may in certain cases render an inflammatory origin probable, as B. propounded in the first part of his essay on optic neuritis.

In three cases of Leber's family optic atrophy the normal dark adaptation spoke in view of the seriousness and increasing deterioration of the visual field and vision against an inflammatory basis.

In intoxication amblyopia the dark adaptation was slightly diminished in the majority of cases, but B. does not attribute much value to the examination of these patients, as they could not be observed for sufficient length of time.

In descending atrophy from insufficient nutrition of the nervous substance in consequence of arteriosclerosis and perivascular gliosis, the dark adaptation was diminished during the acute stage as long

as tissue was being destroyed. Simple descending atrophy, generally by injury or chronic traumatism from compression by arteriosclerotic resp. aneurysmatic vessels, tumors, etc., shows in spite of the equal or similar ophthalmoscopic picture, the opposite behavior of dark adaptation from the meta- or para-syphilitic progressive atrophies, which in the very first stages regularly reveal an intense decrease of dark adaptation. This is the earliest symptom of tabic atrophy of the optic nerve, before this can be recognized ophthalmoscopically. B. attributes this to the degeneration of the medullary sheaths and axis cylinders caused by the toxic products of metabolism of the virulent spirochaetae in the nervous substance itself.

According to B.'s investigations the clinical course of tabic atrophy of the optic nerve shows four phases: I. Isolated disturbance of adaptation with normal ophthalmoscopic condition, normal vision, visual field, and color-sense. II. Disturbance of adaptation and ophthalmoscopically certain atrophy with normal other functions. III. Disturbance of adaptation, optic atrophy, defect of the visual field for white and colors, impairment of central vision. This phase in the majority develops so that the disturbance of the visual field precedes the diminution of central vision for a shorter or longer time. IV. Optic atrophy-amaurosis. He also observed in a few cases of typical reflex iridoplegia an enduring intense diminution of dark adaptation of the retina (in mydriasis) without the occurrence of ophthalmoscopic signs of atrophy of the optic nerve during several years observation. C. Z.

VISUAL FIELD

SCINTILLATING SCOTOMA.—SWIFT, GEORGE W., Seattle (*North-west Medicine*, March, 1916), describes scintillating scotoma and illustrates, with four case reports, the classic symptoms: hemianopsia, numbness, headache, sleep. He questions the etiology as described by Fuchs, Roemer, and others as due to faulty innervation of the blood vessels and offers a theory based upon Crile's theory of the kinetic system. He holds that anyone is liable to an attack of sc. scotoma whenever the kinetic system becomes overworked and its perfect harmony has become disturbed; that this symptom complex gives a positive clinical demonstration of the Crile theory. The effect of mental strain over a period of time, extreme physical strain, or sudden shock all lead to a degree of exhaustion which

disturbs the kinetic system. An increase of epinephrin secretion causes over-activity of the brain cells resulting in exhaustion. This is followed by the scotoma, numbness and a congestion of the brain causing the severe headache. Sleep permits a return to normal conditions. The effect of quinine sulphate is similar to morphia—i. e., decreases or arrests the epinephrin secretion.

H. V. W.

HEMIANOPSIA.—PECK, GRANT S., Denver (*Jour. Ophthal., Otol. and Laryngol.*, February, 1916). The case of a lady of sixty is reported. While traveling on an eastern train she was taken with an attack of nausea and dizziness and left homonymous hemianopsia, with general weakness and prostration. Her blood pressure was found to be 120 mm. Hg. and a diagnosis was made of a hemorrhage in the extreme end of the posterior limb of the internal capsule. A year later she had a similar attack of dizziness and nausea and prostration. A year later she had another attack, followed in a week by another, in which for the first time aphasic symptoms developed. Within a week there was another attack. During the next eight months she had two or three light attacks, the last of which was attended with difficulty of articulation and the use of wrong words. The author ascribes as the cause a slowing of the blood stream by a thrombus, which upon putting the patient at rest cleared up. He then enters into a general discussion of hemianopsia.

M. B.

VISUAL DISTURBANCES, ESPECIALLY BITEMPORAL HEMI-ANOPSIA, IN TUMORS OF THE HYPOPHYSIS.—JOSEFSON, A., Stockholm (*Klin. Mon. f. Aug.*, 55, p. 636), calls attention to the fact, that he was the first, who in 1903 described the quadrant anopsia and quadrant achromatopsia in the upper temporal visual field as important and novel symptom of enlargement of the hypophysis, as was recently corroborated by Cushing and Walker (1915). He gives a brief resumé of a case of acromegaly, reported by him in 1903, with charts of the visual fields.

C. Z.

JAPANESE ABSTRACTS**ABSTRACTS FROM THE NIPPON GANKAKAI-ZASSHI.**

(JULY-DECEMBER, 1915).

PROF. DR. KOMOTO.

DR. H. S. GRADLE.

TSUTHIBASHI: CONCERNING THE LENGTH OF THE PALPEBRAL APERTURE IN YOUTHFUL JAPANESE WITH CONSIDERATION OF THE AGE AND HEIGHT; SIMILAR STUDIES ON CHINESE. From this extensive series of examinations, the length of the palpebral aperture was found to average 29.23 mm.—interpupillary distance 61.74 mm. and distance between inner canthi 33.81 mm.; in Chinese students, these figures were 30.22 mm., 65.51 mm., 35.41 mm.

NAKAMURA: GONORRHOEAL INFLAMMATION OF THE BUCCAL MUCOSA IN A CASE OF BLENNORRHOEA NEONATORUM. Report of a case with this very unusual condition.

MINE: CONCERNING IRIS GUMMATA. Histological examination of a case. A partially necrotic inflammatory tumor filled the anterior chamber and penetrated at the limbus. The vessels were almost entirely obliterated by the growth; the lens was disturbed, and in its periphery, partially replaced by round, epithelioid, and plasma cells.

INOUE: NEW DESIGNATION OF THE MERIDIA OF ASTIGMATISM. The author advocates the use of the hour figures, but does not eliminate the disadvantage of requiring the designation "before" or "after" 12 o'clock. The following is an example as he uses it:

R.—1.5 D.—Cyl. 1.25 axis 12 after IX.

L.—2.0 D.—Cyl. 1.75 axis 18 to III.

The advantages of this method are questionable.

MARUO: NEW TRACHOMA FORCEPS. A trachoma forceps with a long slightly curved loop on the anterior end.

KOYANAGI: RETINAL CHANGES IN LEUCAEMIA. As a result of his histological examinations, the author agrees with Meller that the retinal nodules arise from the lymph corpuscles newly formed at the site of the nodule and not from the lymphocytes that wander out from the retinal vessels. He bases this on the fact that the retinal lymphocytes are larger than those found within the blood-vessels.

ISHIWARA: CONCERNING OGUCHI'S DISEASE. This disease, first described by Oguchi in Graefe's Archiv, consists in a congenital hemeralopia with the ophthalmoscopic finding of a grayish-white fundus that, in darkness, assumes an abnormal color. This finding, which has been frequently observed, is explained by the author as the probable result of a temporary opacity of the external layers of the visual cells, due to light. Normally, the substance contained in these cells becomes emulsified in the presence of light, but does not become opaque.

UCHIDA: A CASE OF AMYLOID DEGENERATION OF THE CONJUNCTIVA. In a 44-year-old man there appeared spontaneously in the left eye an amyloid degeneration of the conjunctiva of such massive extent that the lids could not be opened. Histologically the conjunctiva showed a heavy plasma cell infiltration and a layer of amyloid degeneration, containing in spots hyaline masses. The endothelial cells of the vessels were so degenerated that it seemed probable that the degenerative process arose in these cells.

MIKA: AMYLOID-LIKE DEGENERATION OF A CORNEAL STAPHYLOMA.

KOMOTO: THE TREATMENT OF PHLYCTENULAR DISEASE. The simple cases are easily cured with any of the usual therapeutic agents, but in the severe ulcerative cases, Pyoktanin (2%) has almost a specific action. In the very severe resistant cases in children, the following procedure has proven successful: Under chloroform anaesthesia, the palpebral conjunctiva and the fornix, even if not diseased, are very lightly touched with the curved paequelin cautery and followed by brushing the cornea with 5% silver nitrate. This is never dangerous and is always followed by prompt relief of the blepharospasm, as daily use has proven. Occasionally the treatment has to be repeated. This of course, does not protect against recurrences, but we have seen children who have been free from relapses for many years. In case of keratitis fasciculosa, we curette the entire diseased area and touch the wound with pyoktanin. This drug acts almost as a specific against the eczema of the lids, but must be preceded in case of moist or purulent forms with astringents or salves.

ONISHI: RETE MAGICUM. Under this title, the author described an apparatus consisting of a long and rather wide box, into which

the observer looks with both eyes. In the front and in the middle are lateral windows and in the interior are two septal walls, the more distant one of which carries any sort of a picture. The wall nearest the observer is a sliding lattice. If both eyes are directed upon this lattice, which is then shoved forward, the anterior picture seems to recede behind the lattice and vice versa. The author explains this magical phenomenon upon the basis of false direction of the eyes.

August.

SUGANUMA: ANATOMICAL EXAMINATION OF A CASE OF RETINITIS PROLIFERANS BLINDED BY A VITREOUS HEMORRHAGE AND THE RESULTS OF THE ANIMAL EXPERIMENTS IN THIS CONNECTION. The author came to the conclusion that the newly-formed tissue masses can result from the proliferation of the retinal glia fibres as well as from the new connective tissue subsequent to the hemorrhage and that the probability that a retinitis proliferans may exist independent of vitreous hemorrhages cannot be denied.

IMAI: KERATITIS PARENCHYMATOSA WITH FATTY DEGENERATION. There appeared in a 52-year-old woman an opacity of the cornea that gradually spread over the entire cornea with recurrent attacks of inflammation. As the inflammation could not be relieved the cornea was completely removed. The histological examination revealed that the parenchyma, between the lamellae, was densely infiltrated with fat. This corresponds to the description of Takayasu and Tersch.

MYASHITA: A CASE OF UNUSUAL WIDTH OF THE PALPEBRAL APERTURE AS THE RESULT OF A HYPOPHYSIS TUMOR. Description of an unusually wide palpebral aperture (34.5 mm. wide) of apparently spontaneous origin. Excepting for a very slightly pale disc, the eye was normal. Vision in either eye with correction — 0.6. The visual field was that of a bitemporal hemianopsia. The Roentgen picture revealed an enlarged Sella Turcica with the probable presence of a hypophysis tumor. No acromegaly, but a large skeletal formation dating from the tenth year of life. If Elschnig's case is to be regarded as a congenital anomaly of the palpebral aperture, this case must be considered as an acquired one.

HATZUMI: AN EXCEPTIONAL CASE OF ACUTE MYELITIS, COMBINED WITH RETROBULBAR NEURITIS WITH IMPROVEMENT AFTER

40 DAYS AMAUROSIS. In a 34-year-old woman, there appeared a sudden decrease in vision in the right eye without ophthalmoscopic changes, following an acute cold. Two weeks later, a complete paralysis of the lower extremities set in, followed in two weeks by complete blindness of the left eye. Within three weeks, the vision began to improve. The author believed the disorder to be due to the toxins of the influenza bacillus.

SHIGETA: A CASE OF FIBRO-SARCOMA OF THE DURAL SHEATH OF THE OPTIC NERVE.

WATANABE: A CASE OF NYSTAGMUS IN A COAL MINER. This is the first case of this disorder ever reported in Japan, although coal mining is extensively carried on.

IZIKAWA: CAVERNOUS DEGENERATION OF THE OPTIC NERVE IN THE PRESENCE OF ORBITAL GUMMATA.

KOMOTO: SHORT CASE REPORT.

ONISHI: A SUTURE FOR ADVANCEMENT. After the conjunctival incision, a double armed suture is carried through the superficial layers of the sclera. The muscle is laid free and the ends of the threads carried through the muscle from behind forwards and again through the conjunctiva, close to the limbus. These are tied so that the severed muscle tendon is fixed in its new location.

September.

EUSITA: KERATITIS PARENCHYMATOSA IN DOGS CAUSED BY TRYPANOSOMES. This condition was first observed by the author in Formosa. Experimentally, he injected blood containing trypanosomes, but usually produced an iritis or irido-cyclitis. However, once he was successful in causing a keratitis parenchymatosa that began in the middle of the cornea and spread out over the entire surface. The trypanosomes were found in the cornea. As the injection of sterilized blood never resulted in this condition, the author disagrees with Leber on the point that the keratitis is due to the toxins of the trypanosomes.

KUSAMA & NAKANO: ADRENALIN IN THE BLOOD OF GLAUCOMA PATIENTS. The authors criticized the various views regarding the

adrenalin content of the blood of glaucomatous patients and in their experiments used the Trendelenburg method as the most delicate. Contrary to the opinion of Kleskowski, they found that the blood of these cases had a lower adrenalin content than the blood of normal individuals and consequently could not ascribe the increased blood pressure of these cases to this cause.

KITASONO: A CASE OF RETRO-BULBAR ABSCESS WITH DETACHMENT OF THE RETINA. A retro-bulbar abscess developed in a young girl following an incision for a hordeolum. A retinal detachment appeared, involved 1/6 of the entire retina. Incision of the abscess was followed by a reattachment of the retina, but a complete amaurosis remained. The disc was atrophic and the central vessels almost white.

KAGOSHIMA: THE STATISTICAL PHASE OF GLAUCOMA. Among 21,455 private patients, the author found glaucoma in 42 (0.195%), divided into 38.09% among men and 61.91% among women. The average age of the men was 46-50 years and the women 51-55 years. The ages of 66-70 came next in point of frequency. The right eye predominated over the left in the proportion of 14:12 and the majority of the cases appeared during the cold weather. Half of the cases used neither alcohol nor tobacco.

SETO: A CASE OF UNILATERAL ABDUCENS PARESIS WITH FACIAL ERYSIPELAS. Five days after the disappearance of the erysipelas, an abducens paralysis developed, probably an intoxication paralysis. This is said to be an extremely rare condition and only a few cases have been reported.

ONISHI: ENOPHTHALMOS FOLLOWING ORBITAL OPERATION. Following extirpation of orbital tumors, the author saw retraction of the eye in only two cases. The condition must be rare as these are the only cases where the author found the enophthalmos, despite a large experience with orbital operations.

October.

KUBOKI: CONCERNING RETINITIS PUNCTATA ALBESCENS. A typical case.

MYASAKI: EXAMINATION OF THE EYES IN THE GRADE SCHOOLS OF NAGASAKI. Statistics.

KAGOSHIMA: THE FORMATION OF PERIPHERAL GROOVES IN THE CORNEA, COMPLICATED WITH ECTASIA. A typical example of this condition was observed in a 56-year-old patient with the following histological points:

(1.) The epithelial layer was thin, only bordering the diseased parts, while the central unaffected portions of the cornea were covered with a much thickened epithelium.

(2.) Bowmann's membrane was almost entirely lacking.

(3.) In the superficial parenchyma, the connective tissue lamellae were very loose and irregular.

(4.) Interstitial round cells alternated with areas of fatty degeneration. From this and other cases, the author concluded that groove formation is twice as frequent in men as in women; appears most frequently between 60 and 70 years of age; although it has been observed in a 31-year-old woman; in unilateral cases, the right side is most frequently affected; the patient has no subjective symptoms at first, but eventually becomes aware of the trouble through a decrease in vision; the groove formation may affect only a small portion of the periphery, or may involve the entire periphery; usually a few vessels may be found which end at the margins. Ectasia is the most frequent complication of groove formation; pterygium occurs in about 18%; arcus senilis in 27%; and astigmatism in practically all of the cases as a result of the disease.

MORI: A CASE OF SPONTANEOUS HOLE IN THE MACULA. In a 64-year-old patient, the author observed in the center of the left macula a dark-red, slightly oval area with sharp borders, but surrounded by a gray zone. Between the macula and the disc, the retina was somewhat turbid and the macular vessels were very tortuous. An absolute central scotoma was present. The right eye was normal except for a relative central scotoma that disappeared under antisyphilitic treatment. The author believes that the hole was the result of an oedema of the fovea centralis, the most accepted theory.

WADA: AN EXTREMELY UNUSUAL CASE OF RETINAL CHANGES. (HIPPEL'S DISEASE.) A 24-year-old student had noticed a decrease in the vision of his left eye for the past four months. The examiner found a typical case of Hippel's disease; a light dirty-gray fundus with a red sacculated area in the lower outer periphery.

surrounded by a grayish-white zone; an artery and a vein, so similar in both breadth and color that they could be differentiated only by the branches, united at this area. The area in question seems to be covered by a light-gray thin membrane, which by inclusion, divides the sac into three parts. In the membrane are numerous very delicate vessels, of irregular contour. The visual field shows an absolute central scotoma and a large defect up and out. During the two years that the case was under observation, there developed a new, round, gray area about the size of the disc, with a red spot in the exact center. This appeared to be a new center of the same character. The entire picture corresponded closely to the description of the disease of Hippel.

KOMOTO: PRAECORNEAL IRIDOTOMY. The author has employed this technique for a long time and praises it because of its simplicity and the advantages that result from its use in certain cases of artificial pupil formation. The technique is essentially that described by Axenfeld and has never been followed by any unpleasant consequences.

ONISHI: OLD GLASSES. A discussion of the history of glasses in Europe. The first glasses in Japan were brought from India in 1529 by the Portuguese, while the original manufacture of glasses in Japan was carried out by Hamada, a collaborator and competitor of Hollaender of Formosa, during the beginning of the 17th century. In Chinese literature, it is stated that spectacles were introduced by Malakka, probably in association with the Portuguese. Various forms of the older types of spectacles are depicted.

November.

SHIROISHI: A NEW TRACHOMA FORCEPS.

TAMURA: FORCEPS FOR DOUBLE EVERSION OF THE UPPER LID.

NAKAMURA: WHY DOES THE MYOPE NARROW HIS PALPEBRAL APERTURE? According to the author, the myope narrows his palpebral aperture for the following advantage: The small opening decreases the circles of diffusion as can be shown photographically; with a narrow aperture, the cilia come before the pupil, thereby increasing the visual acuity slightly, as can be easily proven; the narrow aperture retards the flow of the tears and thus counteracts to a slight extent the prismatic effect of the corneal curvature;

further, the pressure of the lids during the act of winking tends to shorten the vertical radius of curvature of the cornea. All of these facts, the author was able to prove experimentally upon his own eye.

OKUSE: A CASE OF TRAUMATIC MYOPIA. Following a contusion, there appeared in this patient a myopia of about 4 D. with a shallow anterior chamber and a decrease of the intra-ocular tension to 10 mm. Hg. It is very difficult to explain the occurrence of this myopia but the author believes that in some manner, the ciliary body was injured so that the secretion of the aqueous was affected. This threw the lens forward and reduced the optical system of the eye to a myopic basis.

OKUSE: A CASE OF TETANUS AS THE RESULT OF THE INTRUSION OF A FOREIGN BODY INTO THE CONJUNCTIVAL SAC. Splinters of wood fell from above upon the eye of a 40-year-old woman, with the result that a few pieces were forced into the conjunctival sac and remained there. The lids were greatly swollen and under tension. Although the pieces of wood were removed, tetanic spasms followed and the patient died within two weeks. A resumé of the literature follows.

OKUSE: A CASE OF PEMPHIGUS ACUTUM. In a 30-year-old woman, there suddenly appeared, with febrile manifestations, patches of pemphigus upon various portions of the body. These were so severe that the nails fell off. The buccal and conjunctival mucosa were not spared and a condition of symblepharon and xerosis followed the attack. The cornea became dry and very opaque and the attempt to transplant mucous membrane from the lips failed. Various oils, to relieve the dryness and pain were tried without success. Finally, the patient produced an oil that was successful. This was the result of cooking dried "Neunaugen" and collecting the oil therefrom. ("Neunaugen" and eels are used here frequently to cure hemeralopia.)

SENNICHI: OCULAR TUBERCULOSIS. Several cases of intra-ocular tuberculosis.

NAKANO: A CASE OF CONJUNCTIVAL PLASOMA. In a 30-year-old man, the left upper lid began to droop, gradually and spontaneously. Upon everting the lid, there could be seen a tumor-

like red thickening of the conjunctiva, that upon section proved to be composed of plasma cells.

KOMOTO: SHORT COMMUNICATIONS.

ONISHI: AN ADDITION TO THE STUDY BY WADA OF HIPPEL'S DISEASE. Bibliography.

December.

KUSAMA: PRIMARY FAT DEGENERATION OF THE CORNEA. (THE FORMATION OF CHOLESTRIN CRYSTALS IN THE CORNEA.) The author showed by histo-chemical means, that in primary fat degeneration of the cornea (first described by Takayasu and Tersch), cholestrin crystal formation plays one of the most important roles.

SAITO: REPEATED LUXATION OF THE LENS INTO THE ANTERIOR CHAMBER. Following a glaucoma iridectomy, the lens luxated repeatedly into the anterior chamber.

JEBISAWA: A NEW TYPE OF STAR FIGURE FOR ASTIGMATIC INVESTIGATIONS.

MASUDA: FAMILY PROGRESSIVE DEGENERATION OF THE MACULAR REGION. An apparently typical case of this very rare condition is here reported from the Tokio eye clinic. A 20-year-old patient had had poor vision for the past 11 years: R. fingers at 1 M.; L. fingers at $1\frac{1}{2}$ M., due to a bilateral central scotoma. In the macula was an oval, dirty grayish-white area, with sharp outlines of irregular contour, due to many small similar areas lying at the margins. In the diseased area were many small pigment granules superficially distributed. Anemnesically, there was a similar trouble in the family. The author quotes several similar cases and concludes that the disease begins at about the tenth year of life and attains its maximum intensity at about the fifteenth. The main changes consist in the dirty gray alterations in the macula, while the peripheral portions of the retina remain normal. The individuals are healthy from a systemic standpoint and syphilis has never been found present. The author believes that here was a disease, similar to the case reported by Stargardt.

KAGOSHIMA: SPECTRO-CHEMICAL STUDIES REGARDING THE BLOOD-LIKE EXUDATES IN THE ANTERIOR CHAMBER IN HEMORRHAGE THROUGH THE CORNEA. The author could show that these

exudates consisted of oxydized hemoglobin* that are still further changed under the influence of light. By the elimination of the globulin, the exudates are changed to methaemoglobin and probably during the course of time, to melanosiderin.

MIKAMO: A CASE OF HEMERALOPIA WITH FUNDUS CHANGES CONSISTING OF THE PRESENCE OF MANY SMALL FINE WHITE POINTS. In a case of hemeralopic disease with Xerophthalmos, there were found in the fundus many small white fine points in the horizontal meridian, very similar to the changes in retinitis punctata albescens. But as the hemeralopia cleared up, the points disappeared entirely.

ONISHI: TRANSPLANTATION OF RABBITS' EYE DURING ENUCEATION. The author used the technique of Lagrange, and watched the cases for 8-10 months with any extrusion of the implant. He laid stress upon the complete hemostasis from the cut optic nerve and upon the use of well-sterilized catgut.

Book Reviews

American Medical Directory. Fifth Edition.

The new edition will be received by the profession in general with enthusiasm at first and will become almost indispensable as one learns to use it. The new edition contains all the useful information of the previous book with additional information in regard to all departments of public health work. It is surprising how much general information is included in the volume that one usually considers merely a directory. The various colleges, the history of each one, the different societies, special societies, members of special societies in each city, foreign societies, the constitution and by-laws of the A. M. A. and other general information is easily found, while in the index of each state one finds the medical practice act, the state examining board, state health board, state association and county association officers, state institutions, hospitals and charitable institutions. The directory has been carefully revised, many additional names added, and is complete in every detail. The amount of work required in such a book is enormous and therefore should have the support of every member in the profession.

G. W. SWIFT.

Refraction of the Human Eye and Methods of Estimating the Refraction, Including a Section on the Fitting of Spectacles and Eyeglasses, Etc.—Thorington, James, A. M., M. D.

The entire subject of refraction is handled by the author in a masterly manner. The book is very well illustrated, there being twenty-seven colored plates. The first chapter is devoted to "optics" and the underlying laws of physics. Three chapters are devoted to prisms and their application, followed by one chapter on lenses and their combinations. Chapter VI is given entirely to the physiology of the eye, the various angles, and accommodation: hypermetropia, myopia, astigmatism, retinoscopy, the use of the various instruments, applied refraction, presbyopia and cyclopedies are all fully discussed.

The book contains twenty-three chapters, covering nearly 400 pages. The price, \$2.50, places it within the reach of all. It is especially adapted to the beginner because of the simplicity of form and careful illustration.

G. W. SWIFT.

The Principles and Practice of Perimetry.—Peter, Luther C., A. M., M. D., F. A. C. S.

This new publication handles the subject of perimetry in a very clear and instructive manner. Practically every subject connected in any way with the visual field is discussed. The normal field, its limits, variations and the physical laws governing light projection are first considered. The factors outside the eye having an influence upon the normal field are fully explained. Part II describes the manner of taking fields, and the various instruments employed. This is very complete. Part III deals with the anatomy and physiology of the visual tract, with appropriate illustrations. Parts IV and V include the pathology of the visual fields, with a description and explanation of the various scotomata, irregular fields and anomalies. Part VI is devoted to the field in functional diseases, hysteria, neurasthenia and migraine. A complete bibliography closes the volume.

G. W. SWIFT.

Diseases of the Retina.—Leber, Th., Heidelberg. Graefe-Saemisch-Hess, *Handbuch der gesamten Augenheilkunde*, second, entirely new, edition. Nos. 265 to 267, pp. 1571 to 1810, with numerous illustrations. Leipzig. Wilhelm Engelmann, 1915. 6 M. \$1.50.

These numbers of Leber's great work on the diseases of the retina deal in the same thorough fashion, as set forth in our reviews of the previous installments, with detachment, ruptures, entozoa, and glioma of the retina. Leber thinks that traumatic detachment of the retina most likely always occurs in such a way that the retina in consequence of the contusion is torn generally at the region of the ora serrata, often in large extent, and that vitreous fluid penetrates behind the retina, separating it from the chorioid. Thus the recent observations of belated detachment of the retina, i. e. a few weeks after the injury, are explained by the assumption that in all these cases the detachment is a consequence of a peripheral rupture of the retina and requires a certain time for its development. L. considers this explanation justified, although in the quoted cases generally no rupture of the retina was found, because it may not be visible on account of its peripheral location. This could be proven in some cases. Leber has for years in expert testimonies maintained that an etiological connection between bodily exertion or strain and detachment of the retina has not been proven or even been rendered probable by clinical experience and anatomo-pathological findings.

In previously healthy eyes a considerable force is necessary for causing traumatic detachment of the retina, while in myopic eyes slight contusions may produce it. Most likely the ectasia of myopic eyes furnishes the factor which elicits the process of retraction, underlying detachment. A combination of statistics from different clinics is given, which shows that 2219 out of 3498 eyes with detachment of the retina had myopic refraction.

The various methods of treatment are described in detail, with critical remarks. In existing myopia L. urgently recommends the avoidance of near work for protection of the second eye.

In the chapter on traumatic tears and formation of holes in the retina and the origin and commotion of the retina L. propounds that the opacity of Berlin is not due to a real edema, but to a swelling by imbibition, the development of which does not require an active exudation of fluid, as the tissue fluid of the retina and the neighboring vitreous suffices for infiltrating the myelin drops, discharged into the gaps of tissue. Edema, cystoid degeneration, and formation of cysts in the retina are discussed in a special chapter. In the section on entozoa the recent observations of echinococcus in the retina and multiple filaria embolisms of the retinal vessels are presented. The exhaustive discourse on glioma of the retina occupies 88 pages and will be continued in the forthcoming numbers.

C. ZIMMERMAN.

Notices

THE NATIONAL BOARD OF MEDICAL EXAMINERS OF THE UNITED STATES

The need of a standard medical examining body for the whole United States and its Territories (tributary thereto) has occasioned the organization of The National Board of Medical Examiners. It is a voluntary board, the members of which are selected from the medical Corps of the Army, the Navy, and the Public Health Service, the Federation of State Examining Boards, and other representative organizations, and the medical profession of the United States.

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SUBJECT VALUES

1. Anatomy	100
2. Physiology ..	75
3. Chemistry and Physics	75
4. Pathology and Bacteriology	100
5. Materia Medica, Pharmacology, and Therapeutics.....	75
6. Medicine	200
7. Surgery	200
8. Obstetrics and Gynecology	100
9. Hygiene and Sanitation	50
10. Medical Jurisprudence	25
Total	1,000

Passing grade is an average of 75 per cent.

The following subjects will be included:

- | | |
|---------------------------------------|--------------------------------------|
| 1. <i>Anatomy:</i> | 6. <i>Medicine:</i> |
| Microscopic. | Theory and Practice. |
| Embryology. | Physical Diagnosis. |
| Histology and Organ- | Laboratory Diagnosis. |
| ology. | Diseases of Nervous Sys- |
| Neurology. | tem, including psychi- |
| Gross. | atry. |
| Osteology. | Diseases of Children. |
| Dissection. | Tropical Medicine. |
| Applied. | |
| Regional. Topographi- | 7. <i>Surgery:</i> |
| cal. Surgical. | General, including Minor |
| | Surgery. |
| 2. <i>Physiology:</i> | Operative Surgery. |
| | Ear, Nose and Throat. |
| 3. <i>Chemistry and Physics:</i> | Eye. |
| Organic. | Genito-urinary. |
| Physiological. | Orthopedics. |
| Physics. | Radiology. |
| 4. <i>Pathology and Bacteriology:</i> | Skin Diseases. |
| Bacteriology. | Syphilis and Venereal |
| Microscopic Pathology. | Diseases. |
| Gross Pathology. | |
| Surgical Pathology. | 8. <i>Obstetrics and Gynecology.</i> |
| 5. <i>Materia Medica, Pharma-</i> | 9. <i>Hygiene and Sanitation:</i> |
| cology and Therapeutics: | Sanitary Science. |
| Materia Medica. | Epidemiology. |
| Pharmacology. | Vital Statistics. |
| Therapeutics and Pre- | State Medicine. |
| scription Writing. | |
| Electrotherapeutics, in- | 10. <i>Medical Jurisprudence.</i> |
| cluding Radiotherapy. | |

Further information and application blanks may be obtained from the Secretary.

DR. J. S. RODMAN,
2406 Walnut Street, Philadelphia, Pa.

The Summer Graduate Course in Ophthalmology at the University of Colorado will be given June 19th to July 29th. This year it will include a two-hour period, four days in the week, of laboratory work in Histology and Pathology of the eye. There will be

a series of lectures on special topics by well-known men in the profession, outside of the faculty of the university.

The second meeting of the Colorado Ophthalmological Congress will be held in Denver, August 1st and 2nd, 1916. The program of the Congress can be obtained after June 20th, by application to the Secretary, Dr. Wm. H. Crisp, Metropolitan Building, Denver, Colorado.

54 Welbeck St.
Cavendish Sq., London, W.
June 7th.

The Editor *Ophthalmology*:

Sir, I shall take it as a very great favor if any of your readers, who publish articles on the subject of glaucoma or allied conditions, would be so very kind as to send me a reprint of their articles.

In connection with my work of writing the chapter on glaucoma for the *Ophthalmic Year Book*, I have experienced the greatest difficulty in obtaining copies of articles which have appeared in some of the less widely circulated American Journals. Indeed it is quite impossible to obtain some of these anywhere in London.

I am very anxious to make my review of the subject as comprehensive as possible. I shall be grateful for your assistance and for that of your readers.

Yours truly,

R. W. ELLIOT,
Lt.-Col. I. M. S., Retired.

INDEX TO VOLUME XII

ORIGINAL ARTICLES

OCTOBER, 1915.

1. **The Surgical Removal of the Tarsal Cartilage and Palpebral Conjunctiva in 402 Cases for the Prophylaxis, Present and Future Elimination and Eradication of Trachoma.** By DANIEL W. WHITE, M. D., and PETER COPE WHITE, M. D., of Tulsa, Oklahoma 1
2. **Some Clinical Studies on the Trachoma Question.** By EDWARD EVERETT EDMONDSON, A. B., M. D., Oph. D., Mt. Vernon, Ills... 41
3. **Carcinoma of the Caruncle with Report of a Case.** By DR. P. H. DERNEHL, Milwaukee, Wis..... 58
4. **Local Anesthesia in Surgery of the Iris and Lens.** By P. DE OBARRIO, M. D., San Francisco, Cal..... 66
5. **Complete Left Lateral Hemianopsia with Glycosuria as Result of Slight Trauma.** By DR. F. E. WOODRUFF, St. Louis, Mo... 70
6. **Triple Rupture of the Chorioid with Iridodialysis.** By DR. LEIGHTON F. APPLEMAN, Philadelphia, Pa..... 80
7. **Is Migraine a Forerunner of Glaucoma?** By DR. ROBERT SCOTT LAMB, Washington, D. C..... 82
8. **Color Testing.** By GEORGE HENRY TAYLOR, Railway Medical Officer, New South Wales, Australia..... 91

JANUARY, 1916.

1. **The Relative Importance of the Fitting of Glasses in Ophthalmic Practice.** By LINN EMERSON, M. D., New York City... 213
2. **Treatment of Asthenopia Dependent Upon Esophoria Relative to Near Work.** By E. HARRISON ROWE, M. D., Baltimore, Md. 225
3. **The Adaptation of the Test Card to Its Double Function.** By EDWARD JACKSON, M. D., Denver, Colo..... 237
4. **The Color and Moral Sense.** By GEORGE HENRY TAYLOR, New South Wales 242
5. **Palpebral Syphilis: A Review With Case Report.** By DR. FRANCIS W. ALTER, Toledo, Ohio..... 265
6. **State Legislation Concerning Ophthalmia Neonatorum, Paper Two.** By FRANK ALPHEPORT, M. D., Chicago, Ills..... 276
7. **Note on the Use of Iodine in Diseases of the Eye.** By RICHARD KERRY, M. D., Montreal, Que..... 327
8. **The Present Status of Tuberculin Therapy in Ocular Tuberculosis.** By DR. WALTER BAER WEIDLER, New York City... 331

APRIL, 1916.

1. **Mirror Writing.** By SAMUEL HORTON BROWN, M. D., Philadelphia 437
2. **The Relation Between Surgical Operations on the Eyeball and Pyorrhea Alveolaris (Alveolodental Pyorrhea).** By L. WEBSTER FOX, M. D., L. L. D..... 446
3. **A New Method of Dressing Eyes After Cataract Extraction.** By LT.-COL. F. P. MAYNARD, I. M. S., Calcutta..... 458
4. **Gas-Oxygen Analgesia in Eye, Ear, Nose and Throat Surgery.** By WILL WALTER, M. D., Chicago, Ills..... 461
5. **Multiple Wounds of the Eye Due to a Broken Spectacle Lens.** By ALFRED MURRAY, M. D., Chicago, Ills..... 475
6. **Ophthalmic Injuries and Treatment in the Present War.** By SYDNEY WALKER, JR., B. S., M. D., Chicago, Ill..... 478
7. **Retained Foreign Bodies in the Orbit.** By FRANK W. MILLER, M. D., F. R. C. S., Los Angeles, Cal..... 480

8. **Massage in Glaucoma.** By A. A. BRADBURN, F. R. C. S. (Ed.), Manchester 489
9. **State Legislation Concerning Trachoma.** By FRANK ALLPORT, M. D., Chicago, Ills. 494
10. **Pulsating Exophthalmos Treated by Slow Occlusion of the Common Carotid Artery With the Neff Clamp.** By DR. STEPHEN D. BRAZEAU, Spokane, Wash. 511

JULY, 1916.

1. **Miscellaneous Experiments on the Efficiency of the Eye Under Different Conditions of Lighting.** By C. E. FERREE and G. RAND, Bryn Mawr College. 593
2. **State Legislation Concerning Wood Alcohol.** Fourth Paper. By FRANK ALLPORT, M. D., Chicago. 618
3. **Swimmers' Conjunctivitis.** By DR. HARRY S. GRADLE, Chicago. 652
4. **The Value of Accurate Localization of Steel in the Eye and Orbit.** By DR. C. C. CLEMENT, Chicago. 655
5. **A Case of Contusio Bulbi.** By DR. E. E. BLAAUW, Buffalo. 660
6. **The American Method of Cataract Extraction.** by DR. JUAN FERNANDEZ, Havana, Cuba. 667
7. **The Intracapsular and the Capsulotomy Operation for Senile Cataract.** By W. A. FISHER, M. D., Chicago. 672
8. **A Note on the Color Sense in Relation to the Emotion of Sex.** By GEORGE HENRY TAYLOR, L. R. C. P. S., Sydney, N. S. W. 688
9. **Two Thousand Cases of Refraction Analysed with Reference to the Average Frequency and to the Astigmatic Axis.** By H. C. PARKER, M. D., F. A. C. S., Dubuque, Ia. 691

ABSTRACTS

AMBLYOPIA AND BLINDNESS.

Night Blindness in the War	95
Amblyopia ex Anopsia	95
Treatment of Unilateral Amblyopia.....	348
Some Common Fallacies About Blindness.....	348
Teaching the Blind	350
A Case of Hysterical Blindness.....	517
The Blind and Their Sense-Capacity.....	694
Hemeralopia as War Disease	695
On the Possibility of Enabling Amblyopic Patients (Soldiers) to Read	696

ANATOMY.

Ciliary Processes of the Pupillary Area	351
On the Termination of the Efferent Nerves in Plain Muscle-cells and Its Bearing on the Sympathetic (Accessory) Innervation of Striated Muscle Fibre	697
On the Structure and the Innervation of the Musculus Sphincter Pupillae and the Musculus Ciliaris of the Bird's Eye.....	697
The Nerve Distribution of Iris and Corpus Ciliare in Mammals (Man) and Birds	699
The So-called Glands of Treacher Collins in the Pars Plana of the Corpus Ciliare	701

ANOMALIES.

Albinism of the Eyes Without Involvement of the Hair and Skin	352
Congenital Aphakia With Micro-Cornea	352
Congenital Division of the Optic Nerve at the Base of the Skull	352
Albinism in Man, With Special Reference to the Eye.....	517

Anatomo-Pathological Contribution to the Question of Colobomas and Formations of Pits at the Optic Nerve.....	519
Clinical and Anatomo-Pathological Investigations on Congenital Partial Aniridia	703
An Anomaly in the Structure of the Retina of the Whale.....	703
Two Cases of Arteria Hyaloidea Persistens With a Peculiar Narrowing of the Visual Fields	704
BACTERIOLOGY.	
Practical Value of Routine Bacteriological Examinations of the Conjunctiva	532
Gram Negative Diplococci Occurring in the Conjunctival Sac..	520
On Bacterial Intracorneal Inoculations.....	520
Bacteriological and Clinical Studies of an Epidemic of Koch-Weeks Bacillus Conjunctivitis Associated With Cell Inclusion Conjunctivitis	705
On the Action on the Eye and on the Nature of Bacterial Anaphylatoxin Prepared From Bacillus Prodigiosus, and Experiments on Inflammatory Substances Circulating in the Blood of Rabbits After Introduction of Bacteria.....	707
CATARACT.	
A New Conjunctival Flap Incision in Cataract Extraction.....	97
A Method of Artificial Maturation of Cataract Allowing of Early Extraction	98
On the Management of the Lens When Accidentally Dislocated Into the Depths of the Vitreous During the Extraction of a Cataract	98
On Heredity of Senile Cataract	99
On Experimental Progressive Chorioretinal Atrophy and Cataract	99
Treatment of the Earlier Stages of Senile Cataract.....	353
An Operation for Secondary Cataract.....	353
A Cataract Incision Leaving an Undetached Conjunctival Flap With Bridge of Conjunctiva on Temporal Side.....	353
Progress in the Treatment of Cataract in India.....	354
Some Unusual Features in the Case of a Senile Cataract Extraction	354
A Method of Artificial Maturation of Cataract Allowing of Early Extraction	355
Capsular Opacities of the Morgagnian Cataract.....	355
The Solution of Senile Cataract in the Early Stages.....	355
Further Remarks on the Etiology of Senile Cataract.....	356
A New Cataract Operation	521
A New Method of Removing Zonular Cataract	521
On the Behavior of Traumatic Cataract During the Specific "Status Anaphylacticus"	522
Influence of Cataract Operation on the Intelligence.....	522
The Intracapsular Operation for Cataract	523
The Smith-Indian Intracapsular Operation for Cataract and the Results Obtained by It	523
Fifty Consecutive Intracapsular Cataract Operations.....	524
Remarks About Cataracts	524
A Case of Soft Cataract Extraction of the Capsule.....	524
Unusual Cataract Operations	707
Management of the Eyelids During the Cataract Operation...	707
The Arrest of Cataract at an Early Stage.....	708
Some Impressions of Expression of Cataract With a Sliding Conjunctival Flap	708
Cataract in Experimental Thyroidectomy	709
Acutely Originated and Cured Cataract With Glaucoma.....	710
CHORIOID.	
A Case of Metastatic Chorioiditis	100
The Chorioidal Tubercle in Tuberculous Meningitis.....	711
Gumma of the Chorioid	712

CILIARY BODY.

- Some Aspects of the Ciliary Body in Health and Disease..... 100

CIRCULATION.

- The Prognostic Significance of Changes in the Retinal Vessels 101
 A Case of Retinal Hemorrhage With High Blood Pressure Apparently From Excessive Use of Tea..... 104
 Retinal Angiosclerosis and Associated Lesions..... 104
 The Significance of the Transparency of the Retinal Blood Columns 105
 Congenital Absence of the Arteria Centralis Retinae With Embryonic Remnants Over the Macula Lutea 105

CONJUNCTIVA.

- Granuloma Conjunctivae Produced by a Foreign Body..... 105
 The Treatment of Gono-Blennorrhoea of the Newborn and Adults at the Eye Clinic of the University of Bern..... 106
 Is There a Sympathetic Amblyopia? 106
 Samoan Conjunctivitis 356
 Phlyctenular Conjunctivitis, Its Importance in the Conservation of Vision 356
 A Further Report on Parinaud's Conjunctivitis 357
 A Case of "Squirrel Plague" Conjunctivitis in Man..... 357
 Hypertrophy of the Conjunctiva 358
 Pemphigus of the Conjunctiva 358
 Gonorrheal Inflammation of the Buccal Mucoia in a Case of Blennorrhoea Neonatorum 787
 A Method of Treatment for Conjunctivitis..... 713
 Purulent Conjunctivitis in Infants Under Two Months of Age 713
 A Case of Amyloid Degeneration of the Conjunctiva..... 788
 The Treatment of Phlyctenular Disease 788
 A Case of Conjunctival Plasmoma 794

CORNEA.

- Double-sided Pigmentation of the Cornea 106
 Three Cases of Keratitis Parenchymatosa Cured by Salvarsan or Neosalvarsan 107
 Bilateral Symmetrical Degeneration of the Cornea With Deposits of Uric Acid and Urate of Sodium in Otherwise Normal Eyes and Normal General Condition..... 107
 On Senile Marginal Atrophy of the Cornea..... 108
 A Case of Bilateral, Central, Punctiform, Subepithelial Keratitis, "Nodular Keratitis Groenouw," With Anatomical Description 108
 Staining of the Superficially Diseased Cornea With Fluorescein and Biebrich Scarlet Red 109
 On Nodular Opacity of the Cornea 109
 Contribution to the Clinic and Pathological Anatomy of Rodent Ulcer of the Cornea 110
 The Preventative and Curative Treatment of Pneumococcal Ulcer of the Cornea 358
 Keratitis Caused by Infection With Bacillus Coli..... 359
 Peripheral Annular Infiltrate of the Cornea Following a Scleral Perforation 525
 Experimental Contribution to the Etiology of Keratomalacia.. 526
 On Keratitis Pustuliformis Profunda 526
 A Case of Unusual Affection of the Cornea in Chorea Minor, Examined With Abderhalden's Method 527
 Further Contributions to Degenerative Changes of the Cornea.. 527
 Rosacea Keratitis and Certain Other Forms of Marginal Keratitis 715
 Superficial Linear Keratitis 715
 Further Clinical and Anatomical Contributions to the Degenerative Diseases of the Cornea 715

Contributions to the Pathological Anatomy and Operative Therapy of Congenital Hydrophthalmus	716
On Parenchymatous Keratitis in the Red Deer.....	716
Keratitis Parenchymatosa With Fatty Degeneration.....	789
Keratitis Parenchymatosa in Dogs Caused by Trypanosomes..	790
The Formation of Peripheral Grooves in the Cornea, Complicated With Ectasia	792
Primary Fat Degeneration of the Cornea (The Formation of Cholesterin Crystals in the Cornea).....	795
Spectro-Chemical Studies Regarding the Blood-like Exudates in the Anterior Chamber in Hemorrhage Through the Cornea	795
GENERAL DISEASES AND THE EYE.	
Eye Symptoms in Kaposi's Disease, Xeroderma Pigmentosum..	111
Ophthalmoplegic Migraine	111
A Case of Ocular Tuberculosis	115
A Case of Anthrax	116
A Case of Idiomatic Progressiva Familiaris Infantilis, Complicated With Hydrocephalus Chronicus, Gigantismus and Adipositas Universalis	117
On Keratitis Punctata Leprosa and Hematogenous Isolated Bacillar Metastasis in the Avascular Cornea.....	117
Contribution to the Relation Between Acute Retrobulbar Neuritis and Multiple Sclerosis	118
Transitory Hypermetropia in Diabetes	120
Conjunctival Hemorrhage in Typhoid	360
Recent Literature on the Relations of General Diseases to Ophthalmology	360
Iritis Due to Influenza	360
Ocular Phenomena Accompanying Three Cases of Gastro-Intestinal Disorder	360
The Consideration of Systemic Diseases Affecting the Ocular Tissues	360
Primary Syphilis of the Conjunctiva—Fibroma of the Orbit...	361
Acute Axial Optic Neuritis, as an Early Symptom in Disseminated Sclerosis	362
Post-Operative Insanity With Special Reference to Ophthalmic Cases	362
The Eye Symptoms in Kaposi's Disease (Xeroderma Pigmentosum)	363
Double Chancre of the Eyelid	363
On the So-Called Primary Tuberculosis, and the Conjunctival Tuberculosis in Patients Suffering From Lupus.....	364
Eye Lesions as a Point of Importance in Directing Suspicion to Possible Trypanosome Infection	528
The Incidence of Renal Retinitis in Soldiers Suffering From Epidemic Nephritis	528
Ocular Study of a Case of Leontiasis With a Synopsis of Reported Cases Showing Involvement of the Eyes and Adnexa..	529
Herpes Zoster Ophthalmicus	530
Obital Oetema	530
Nervous and Other Medical Disorders as Seen at an Eye Hospital	717
The Ocular Symptoms of Multiple Sclerosis With Report of a Case	718
A Case of Mouth-and-Foot Disease With Ocular Symptoms....	719
Case of Haematoma Dura Matris., Right Frontal Region.....	720
A Case of Pemphigus Acutum	794
Ocular Tuberculosis	794
GLAUCOMA.	
An Operation for Glaucoma—Filtration Secured by a Leech-bite Incision	120
Corneo-Scleral Trephine After the Elliott Method for the Reduction of Intra-ocular Tension	121

Trephining in Glaucoma	121
Juvenile Glaucoma	122
Experiences With Elliott's Operation in Glaucoma.....	123
Remark to Late Infection After Trephining.....	123
The Sclerocorneal Seton in the Treatment of Glaucoma.....	365
The Lagrange Sclerectomy and the Elliott Trephine Operation	365
Elliott's Trephining and Cyclodialysis	366
Late Infection Following Cornea-Scleral Trephining.....	366
An Operation for Glaucoma—Filtration Secured by a Leech-	
bite Incision	367
The Colloidal Theory of the Pathology of Glaucoma.....	367
Glaucoma as a Contributing Etiological Factor in Insanity With	
Report of a Case	368
On Glaucoma. Is Venous Stasis the Cause of Hemorrhagic-	
Fibrinous Transudation From the Vascular Tunic of the Eye,	
Which Frequently Complicates the Operations With Forma-	
tions of Fistulas Against Chronic Glaucoma?.....	368
Glaucoma and Optic Neuritis	531
Glaucoma: A New Theory as to Its Cause and Pathology.....	531
Clinical Lecture on Massage in Glaucoma.....	531
The Present Position of Sclerotomy With Especial Reference	
to the Danger of Late Infection.....	532
Acidosis and Oedema in Its Relation to Glaucoma.....	532
Glaucoma Following Retinal Detachment	533
Contributions to the Doctrine of Glaucoma. Pathological Anat-	
omy. On Preliminary and Early Stages of Cavernous De-	
generation of Tissue in Hemorrhagic and Simple Glaucoma..	535
Abderhalden's Dialysis in Glaucoma and Some Diseases of the	
Optic Nerve	535
Further Investigations on Keratoconus With Abderhalden's	
Method of Dialysis	536
The Indications for Operation in Glaucoma.....	721
Trephining Versus Iridectomy in Glaucoma.....	722
Report on a Gold (Mule-Shoe) Drain for Chronic Glaucoma—	
A New Method to Avoid Usually Employed Flap.....	723
Ethmoid Disease and Its Relation to Glaucoma.....	723
Adrenalin in the Blood of Glaucoma Patients.....	790
The Statistical Phase of Glaucoma	791
HISTORICAL.	
An Old Recipe	124
An Old Book by Abraham Caen.....	124
To the History of the Luminous Appearance of the Eye.....	723
To the History and Critics of the Newer Methods of Treatment	
of Suppuration of the Tear-Sac	724
INJURIES.	
Hydrophthalmos Following Trauma. Report of a Case.....	125
Serious Injury to an Eye From a Bursting Golf Ball.....	125
Non-Industrial Injuries to the Eye.....	126
The Psychology of Traumatic Amblyopia Following the Ex-	
plosion of Shells	127
Face Power Conjunctivitis	128
An Uncommon Wound of the Optic Nerves.....	129
Two Cases of Injuries of the Optic Nerves	130
Two Cases of Lesion of the 5th Nerve by Projectiles.....	131
Injuries of the Eyes by Indirect and Artillery Projectiles Dur-	
ing the Greek-Turkish and Greek-Bulgarian Wars.....	132
Ophthalmological Observations From the Field of War.....	132
Eye Protection for Grinders and Machinists.....	368
A Case of Bi-Lateral Subconjunctival Hemorrhage Apparently	
Due to Centrifugal Force	368
A Case of Traumatic Enophthalmos	369
Penetrating Injury to the Eye From Broken Spectacle Glass.	369

An Unusual Happy Result Following the Removal of an Intra-ocular Foreign Body Which Had Been in the Eye Nearly Four Months	370
Report of a Case With a Foreign Body Located in the Lens....	370
Birth Injuries of the Eye. Report of a Case Presenting a Rupture of Descemet's Membrane	370
Annular Opacity of the Lens, Following a Penetrating Wound Into the Vitreous Chamber	370
A Case of Gonorrheal Iritis Following Traumatism.....	370
Enucleation and Exenteration of Wounded Eyes in the Field...	371
On War Injuries of the Eye and Oculistic Attendance of the Troops	371
On Operative Experiences in War Injuries of the Eye.....	371
Lymphocytosis and Eye Injuries	372
Two Cases of Paralysis of the Cervical Sympathetic Nerve With Ocular Symptoms After Injuries Sustained in the War.....	372
Sharpnel Wound of the Occipital Region With Involvement of the Visual Centers	372
Nervous Symptoms From Contusion of the Eye.....	537
Isolated Traumatic Rupture of the Posterior Lens Capsule....	538
Complete Left Lateral Hemianopsia With Glycosuria as a Result of Slight Trauma	539
Contribution to Injury of the Eye by Glaring.....	539
On War Injuries of the Visual Organ and the Oculistic Activity in the Field Hospital	540
Some Rare Ophthalmic "War" Cases.....	724
The Treatment of "Concussion Blindness".....	725
Traumatic Rupture of Eyeball, Complete Aniridia; Preservation of Lens, With Practically Normal Vision.....	726
Wounds of the Optic Nerve (Illustrated).....	727
Opacity of the Lens After Injury by Lightning.....	729
On Rare Forms of Hemianopic Defects of the Visual Field After Gun Shot Injuries	729
On Dislocation of the Eyeball and Healing in of the Replaced Eyeball	730
Two Rare Injuries of the Eye by Spines of Plants.....	730
To the Knowledge of Traumatic Angiopathy of the Retina....	731
Injury of the Vitreous by a Piece of Copper.....	731
Contribution to Inferior Hemianopsia After Shot Into the Skull	733
On the Symptomatology, Prognosis and Therapy of Orbital Gun Shot Injuries With Projectiles Remaining.....	732
Retinal Disturbances Due to Increased Air Pressure.....	733
A Case of Traumatic Myopia	794
A Case of Tetanus as the Result of the Intrusion of a Foreign Body Into the Conjunctival Sac	794
INSTRUMENTS AND METHODS OF EXAMINATION.	
Careful History Taking With a Type of Eye History Card....	133
The Limitations of the Tonometer	133
Some Convenient Stereoscopic Figures	135
An Accurate Method to Record the Size of Lesions in the Ocular Fundus	135
The Value of the Ophthalmometer	136
Demonstration of an Instrument for Diagnosing Anomalous Color-Perception	136
Optical Properties of Jodiumgreen	137
The Hemiopic Pupillary Reaction as Diagnostic Help.....	138
The Use of the Sideroscope for Detecting Iron in the Eye....	373
A New Hand Campimeter	373
New Retractor for Extirpation of the Tear Sac Operation. Exterior Frontal Sinus Operation and Infant Mastoid Operation	374
An Improved Hatpin for Visual Field	374

A Set of Lacrimal Probes	374
The Clinoscope as a Guide to Operative Eye Work, With an Example	374
A Keratome Which Facilitates the Elliot Trephining Operation	375
A New Pair of Lid Retractors for the Cataract Operation.....	375
Shield for Graefe Cataract Knife and Angular Keratome.....	375
A Form and Color Test Object for Perimetric Work.....	375
A Simple Platoscope	375
The Azo-Projection Lamp (Half Watt Lamp) of the German Auer Company, a Substitute for Nernst Light.....	376
Glass Lid Retractors	376
The Uses of High Frequency Currents in Special Practice.....	541
High-Frequency in Special Practice	541
Electric Magnet in Eye Work	541
The Electric Ophthalmoscope	542
The U-Shaped Electric Magnet	542
A New Light Hearing Apparatus for the War Blind.....	734
An Improvised Giant Magnet	734
A Simple Apparatus to Remove Foreign Bodies From the Cornea	734
On the Measurement of the Depth of the Anterior Chamber With a New Instrument, Intended for Clinical Use.....	734
Transportable Dark Room	735
Examination of the Reflex Images of the Eye With a Loupe Behind the Ophthalmoscope	735
Measurements With Hertel's Exophthalmometer.....	735
New Trachoma Forceps	737
New Trachoma Forceps	738
Forceps for Double Eversion of the Upper Lid.....	738
IRIS.	
Sudden Iridoplegia as the First Sign of Metastatic Ophthalmia	736
Histological Findings After Iridotaxis	542
Gonorrheal Iritis	542
Tuberculosis of the Iris and Sheaths of the Optic Nerve of Cattle	543
To the Knowledge of the Iris in Congenital Melanosis.....	544
Measuring Investigations of the Comparative Physiology of the Pupillary Movement	544
Herpes Iridis and Keratitis Dendritica Profunda.....	735
A Case of Spontaneous Cyst of the Iris With Anatomico-Pathological Description	736
Concerning Iris Gummata	737
LACRIMAL APPARATUS.	
Toti's Operation for Dacryocystitis With the Report of Twelve Cases	139
Operative Treatment of Chronic Tear Sac Disease.....	139
Operative Treatment of Chronic Occlusion of the Tear Duct...	140
Argyrosis of the Lacrimal Sac	142
An Operation for the Direct Drainage of the Lacrimal Sac Into Middle Meatus From the Standpoint of the Ophthalmologist	376
Toti's Operation for Dacryocystitis, With the Report of Twelve Cases	377
A Case of Lacrimal Adenitis	377
Suture of the Lacrimal Canaliculi.....	378
The Use of Lead Styles in the Treatment of the Nasal Duct...	737
Digital Compression of the Lacrimal Sac in Dacryocystitis, Especially of the New-born	738
Suture of the Lacrimal Canaliculus	738
LENS.	
Chronic Inflammation of the Eye Through Free Lenticular Masses in Eyes of Old People.....	142

Shagreen of the Human Lens and Shagreen Globules.....	143
Spontaneous Dislocation of a Sclerosed Lens Into the Anterior Chamber	378
Congenital Aphakia	379
Anterior Lens-Ring Following Contusion Report of a Case, With Theory Relative to Its Pathology.....	379
On the Behavior of the Zonula in Ectopia Lentis.....	379
On the Dependence of the Growth of the Lens Upon the Zonula Zinnii	380
Contribution to the Prognosis of Dislocation of the Lens.....	738
Repeated Luxation of the Lens Into the Anterior Chamber....	795
LIDS.	
Mycosis Fungoides	144
Prevention of Epiphora From Eversion or Incipient Ectropium of the Lower Lid	145
A Contribution to the Removal of Intense Traumatic Cicatricial Coloboma and Ectropion of the Lids, Adherent to the Bone	146
Congenital Lagophthalmus in 4 Generations.....	739
Concerning the Length of the Palpebral Aperture in Youthful Japanese With Consideration of the Age and Height; Similar Studies on Chinese	787
MATERIA MEDICA AND THERAPEUTICS.	
A New Remedy for Diplobacillary Conjunctivitis.....	146
Treatment of Pneumococcic Infections, Especially Serpiginous Corneal Ulcers, With Optochin	147
Optochin in Various External Diseases of the Eye.....	147
Urotropin in the Treatment of Purulent Ocular Infections....	147
Treatment of Ulcus Serpens Cornea With Salicylas Zinzicus... 148	
About the Cuti-Reaction of Noguchi for Lues.....	151
Clinical Experiences With Subconjunctival Injections of Potassium Chloride in Chronic Diseases of the Uvea.....	152
Intraocular Reposition of the Iris	152
Castor Oil as Menstrum for Cocaine	381
On the Treatment of Sympathetic Ophthalmia With Atrophan or Novatrophan	381
Are Cocaine Solutions Injured by Boiling?	381
The Present Status of Tuberculin Therapy in Ocular Tuberculosis	382
On the Specific Optochin Therapy of Pneumococcus Infections of the Cornea. A Clinical, Bacteriological and Experimental Study	382
The Mydriatic Action of Dextrohyoscyamin	544
Local Anaesthesia in Exenteration and Enucleation of the Eye-ball With Solution of Novocain	545
Experimental Contributions to Cauterization of the Cornea by Steam	546
On the Transition of Urotropin Into the Aqueous and the Dissociation of Formaldehyde	547
The Sinusoidal Current in Ocular Therapeutics.....	547
Principles of Electro-Therapeutics	547
The Treatment of Keratitis and Its Sequelae by the High-Frequency Current	548
My Experiences With Electro-Therapeutics in Ocular Diseases	548
Static Electricity in the Treatment of the Eye, Ear, Nose and Throat	548
The Application of the Wassermann Reaction and the Luetin Test of Ophthalmic Practice	740
The Use of Optochin in External Eye Diseases, Excluding Pneumococcic Infections	741
Clinical Experiences With Optochin	742
Specific Therapy of Ulcus Serpens Cornea.....	742
Optochin Amaurosis	743

The Action of Subconjunctival Injections of Salt Solutions in Intraocular Complications of High Myopia.....	743
MEDICAL ECONOMICS.	
Training for Blind Soldiers	153
The Registration of Opticians	383
Occupational Diseases of the Eye	570
Some Observations on Ophthalmic Teaching.....	570
Value of Proper Care of Eyes During Childhood and Adolescence	571
Contributions to the School Hygienic Importance of the Early Diagnosis of Errors of Refraction With Description of a Complimentary Optometer for That Purpose.....	571
The Blind in the State of Washington.....	743
The Future Ophthalmologist	744
On the Influence of Wearing Cataract Lenses on the Earning Power	744
Visual Neuroses of Miners in Their Relation to Military Service	744
MISCELLANEOUS.	
Ocular Diseases in the Army	549
Soap and Water and Opticians	549
The Oculist as Interior Decorator	549
Some Practical Points in Eye Work.....	549
Ophthalmoscopic Observations From a Reserve Hospital on the Southwestern Frontier	549
Ophthalmological Experiences During War Time.....	550
Lumbar Puncture and Examination of the Spinal Fluid in Affections of the Eye	552
The Relation of Light to Life.....	552
Business and Office Methods in Special Practice.....	746
Oculist Versus Optician	746
MUSCLES.	
Strabismus	155
Backward Movement of the Bulb in Abduction With Congenital Paralysis of the Musc. Rectus Externus.....	156
On Unilateral Nystagmus	158
False Heterophoria and Heterotropia	384
Diagnosis of Heterophoria From a Portrait.....	385
Ocular Rotations	385
Contributions to the Knowledge of Nystagmus of Miners. I. Predisposition	385
Torticollis Relieved by Tenotomy of the Inferior Oblique.....	553
Nystagmus and Allied Conditions	553
A Muscle Advancement (The Combined Use of the Advantageous Principles of Worth and Hulen).....	554
Tenotomy of the Inferior Oblique Muscle.....	746
When is Operation Indicated in Strabismus? Presentation of Cases	747
A Case of Nystagmus in a Coal Miner.....	790
A Suture for Advancement	790
A Case of Unilateral Abducens Paresis With Facial Erysipelas	791
MYOPIA.	
Can by Proper Means Myopia be Arrested and the Degenerative Changes Prevented?	386
Late Results of the Operative Treatment of High Myopia.....	555
NERVOUS SYSTEM.	
Bilateral Paralysis of the 6th and 7th Nerves.....	556
Contribution to the Knowledge of Relapsing and Alternating Ophthalmoplegia Externa	556
Neurology and the Eye	747
Disturbances of Vision From Cerebral Lesions, With Special Reference to the Cortical Representation of the Macula.....	748

Paralysis of the 3rd Nerve as First Symptom of an Abscess of the Frontal Lobe, and a Case of Bilateral Abscess of the Frontal Lobes	749
OPERATIONS.	
General Anaesthesia for Eye Operations.....	158
Limbal Puncture	159
An Improved Technique in Forming a Support for an Artificial Eye	160
A Successful Method for the Removal of a Fully Dislocated (Lost) Lens, Heretofore Considered and Referred to by Authorities as "Impossible of Extraction," Together With Five Other Cases	161
Especial Tattooing Task	161
Sclerectomy Ab Externo	162
Implantation of a Globe of Bone After Enucleation and Remarks on Resection of the Optic Nerve.....	162
For the Prevention of Post-Operative Intraocular Infection....	163
Enclosure of Paraffine in the Sclera and Tenon's Capsule....	163
A Successful Method for the Removal of a Fully Dislocated (Lost) Lens, Heretofore Considered and Referred to by Authorities as "Impossible of Extraction," Together With Five Other Cases	387
Tarsorrhaphy	388
An Operation for the Prevention of Symblepharon.....	389
The Use of the Snare as the Final Step in the Enucleation of the Eye	389
External Canthotomy	389
On Anaesthesia by Conduct Through Posterior Orbital Injection. A New Method for Broadening the Indication of Local Anaesthesia in Enucleations and Exenterations of the Eyeball and the Orbit	390
Bone Implantation	391
The Value of the Occlusive Bandage in Corneal Affections....	557
A Simplified Operation for Making an Artificial Pupil in Seclusio Pupillae	557
Conjunctival Plastic With Penetrating Wounds of the Eye and the Relation to Sympathetic Ophthalmia.....	750
Results of Callosum-Puncture in Hydrocephalus With Loss of Sight and Other Decompressive Measures.....	751
Praecorneal Iridectomy	793
Transplantation of Rabbit's Eye During Enucleation.....	796
OPTICS.	
Objects for the Scientific Demonstration of the Visual Acuity..	164
Shooting Glasses	165
Vertex-Refracton in Its True Aspect.....	391
Some Historical Data Concerning Glasses.....	391
Accommodation Spectacles	392
To the Theory of the Accommodation Spectacles of Lauber....	392
Wide-Aperture Lenses—Punktals and Katrals.....	392
To the Question of Biastigmatism and the Employment of Bicylinders	557
Contributions to the Visual Test According to Snellen.....	558
OPTIC NERVE.	
An Abscess of the Optic Nerve	165
To the Anatomy of Colobomas at the Entrance of the Optic Nerve	167
Pseudo-Optic Neuritis	393
An Interesting Case of Acute Retro-Bulbar Neuritis.....	393
Hole in the Disc Associated With Vibration of an Over-Lying Membrane	393
Double Papillo-Edema—Optic Neuritis	393
On Acute Retrobulbar Neuritis Localized in the Chiasm. Clinical and Anatomic-Pathological Investigations.....	394

Two Rare Changes at the Optic Disc (Epipapillary Opaque Nerve Fibres and Pigmentation of the Disc).....	394
On the Development of the Medullary Sheath in the Optic Tract, Chiasm and Optic Nerve	558
A Case of Hypoplasia of Both Optic Nerves.....	559
On Pseudoglioma and Pseudotumor of the Optic Nerve in Intracranial Disease	753
On Primary Tumors and Tumor-like Formations at the Optic Disc	754
To the Treatment of Tabic Atrophy of the Optic Nerve.....	754
An Exceptional Case of Acute Myelitis, Combined With Retrobulbar Neuritis With Improvement After 49 Days Amaurosis	789
Cavernous Degeneration of the Optic Nerve in the Presence of Orbital Gummata	790
ORBIT.	
Traumatic Orbital Phlegmon	167
Bruit Over the Eyeball in Exophthalmic Goiter.....	756
A Case of Retrobulbar Abscess With Detachment of the Retina	791
Enophthalmos Following Orbital Operation.....	791
PARASITES.	
On Ophthalmomyiasis	168
PATHOLOGY.	
Sunstroke and Heatstroke	169
Can the Origin of Glioma of the Retina From the Pigment Epithelium be Considered as Proven?	169
Clinical and Experimental Investigations on Paralysis of the Cervical Sympathetic Nerve	170
A New Method of Preparing an Eye for Microscopic Section..	395
Anaphylaxis Experiments With Old Tuberculin (Koch) in Different Applications, and Remarks on So-called Sympathetic Specific Sensibilization	396
Anaphylaxis in Ophthalmology	396
Anaphylaxis and Eye	396
On Intraocular Anaphylaxis After the Application of Vitreous of Cattle and Sheep as Antigens.....	397
New Formed Bone in Atrophic Eye	560
The Current of the Ocular Fluid Along the Supra-Chorioidea..	561
Iritis and Other Ocular Lesions on Intravenous Injection of Streptococci	562
The Cause of the Ophthalmoscopic Appearances in Amaurotic Family Idiocy	757
PHYSIOLOGY.	
Some Experimental Investigations Concerning Intraocular Pressure	171
The Observation Power of the Daphnia-Eye for Ultraviolet Light	171
The Effect of Light Upon the Living Substance.....	172
Refractometric Investigations of the Aqueous Humor. A Contribution to the Biology of the Eye.....	172
Experimental Contribution to the Behavior of Intraocular Tension After Intravenous Hypertonic and Hypotonic Salt Solutions	173
Light	397
The Protection of the Normal Crystalline Lens Against the Harmful Effect of Ultra-Violet Light	398
The Related Figurative Chiasmal and Mean Cyclopean Images	398
On the Parenchymatous Lymph Current in the Optic Nerve and the Retina	398
Studies on the Regeneration of Corneal Tissue and the True Nature of the Keratoblasts	400
Histological Changes in Experimental Choked Disc.....	400
On Visible Currents in the Anterior Chamber.....	401

On Photographic Measuring of the Interocular and Pupillary Distances in Moving the Eyes From Below Upward in Medium Fixation	402
The Blind Spot	563
Exophthalmometric Measurements in Normal Individuals and Their Relations to the Size of the Orbital Aperture.....	564
Conscious Vision in the Development of the Amblyopic Eye...	564
The Determination of the Relative Position of Rest, by Prolonged Occlusion of One Eye	565
Physiological Ido Donesis	567
Purkinje's Phenomenon in the Central Area of the Visual Field	567
Clinical Investigations on the Dependence of Intraocular Tension of the Quality of the Blood.....	568
About De- and Regeneration of the Motoric Endplates and the Double Intervention of the Striated Muscle-Fibres of the Mammalia	569
Optical Illusions	569
The Light Sense of the Maggots of <i>Calliphora Erythrocephala</i> (The Blow-fly)	758
Contribution to the Knowledge of the Physiology of the Lacrimal Passages	758
Investigations in Regard to the Heredity Physiological and Pathological Characteristics of the Eye in Men.....	760
Position of the Eyeball in the Orbit Under Different Physiological Conditions	763
Influence of the Width of the Pupil on Adaptation.....	764
REFRACTION AND ACCOMMODATION.	
Refraction of Mentally Defective Children	174
The Admission of Men With Glasses Into the Army.....	175
An Observation Regarding the Theory of Emmetropia.....	176
Errors of Refraction and Their Average Frequency.....	403
The Advantages of a Small Amount of Astigmatism, With the Rule	403
A Plea for the More Uniform Reporting of Visual Acuity....	403
Apparent Accommodations in Aphakia	404
Fragments on Errors of Refraction and Correlative Anomalies	405
Remarks to Straub's Theory of Emmetropia	405
Anomalies of the Accommodation, Clinically Considered.....	765
Regular Astigmatism of the Cornea Produced by a Tumor of the Orbit	765
The Influence of Pressures of the Eyelids on Astigmatism....	766
Fusion of Important Factor in Ocular Efficiency.....	767
New Designation of the Meridia of Astigmatism	787
Why Does the Myope Narrow His Palpebral Aperture?.....	793
A New Type of Star Figure for Astigmatic Investigations....	795
RETINA.	
Retinitis of Pregnancy	178
Detachment of Retina Cured by Galvano-Puncture of Sclera, Combined With Subconjunctival Injection of Mercury Cyanide	179
Retinitis Exudativa	179
Retino-Chorioiditis Juxtapapillaris	180
On Retino-Chorioiditis	181
Anatomo-Pathological and Experimental Investigations to the Knowledge of Primary Tuberculosis of the Retina.....	182
Retinitis of Pregnancy	406
Detachment of Retina Cured by Galvano-Puncture of Sclera, Combined With Subconjunctival Injection of Mercury Cyanide	407
Cure of Spontaneous Detachment of Retina by Multiple Scleral Puncture	408
Retinitis Pigmentosa Treated by Trephining.....	408

Spontaneous Reattachment of the Retina After Twenty-two Years Duration	409
Retino-Chorioiditis Juxtapapillaris	409
A New Operation for Detached Retina	409
To the Histology of Diffuse Gliosis of the Retina.....	410
Detachment of the Retina Cured by Scleral Trephining.....	411
Successful Operation of a Post-Traumatic Detachment of the Retina	411
A Case of Exudative Retinitis	412
The Clinical Aspect of Embolism of the Central Retinal Artery Produced by Rupture of the Artery in the Stem of the Optic Nerve in Bright's Disease	412
Anatomical Examination of a Case of Angiomatosis of the Retina (von Hippel's Disease)	572
Retinitis Externa Exudative With Bone Formation in a Seeing Eye	572
Aviator's Dazzling (Blendung)	574
Detachment of the Retina	768
Concerning the Surgical Treatment of Retinal Detachment....	768
Tuberculosis of the Retina, Recurring Hemorrhage and Retinitis Proliferans	771
Concerning the Surgical Treatment of Retinal Detachment...	771
Retinitis Exudativa	772
Retinal Changes in Leucaemia	787
Anatomical Examination of a Case of Retinitis Proliferans Blinded by a Vitreous Hemorrhage and the Results of the Animal Experiments in This Connection	787
Concerning Retinitis Punctata Albescens	791
A Case of Spontaneous Hole in the Macula.....	792
An Extremely Unusual Case of Retinal Changes.....	792
An Addition to the Study by Wada of Hippel's Disease.....	795
Family Progressive Degeneration of the Macular Region.....	795
A Case of Hemeralopia With Fundus Changes Consisting of the Presence of Many Small Fine White Points.....	796
SCLERA.	
Massive Granuloma of the Sclera (Brawny Scleritis) With the Report of an Unusual Case	574
SINUSES AND NOSE.	
An Unusual Complicated Case of Sphenoidal Abscess Causing Amblyopia	413
Report of Three Cases of Monocular Blindness Due to Sinus Obstruction, With Recovery of Vision	413
On Acute Osteomyelitis of the Frontal Bone in Consequence of Combined Empyemas of the Anterior Accessory Cavities of the Nose	413
Ocular Tuberculosis of Nasal Origin	773
Fundus Changes in Suppurative Intracranial Disease of Otic Origin	774
SYMPATHETIC OPHTHALMITIS.	
On Necrosis in the Exciting Eye in Sympathetic Inflammation	183
Some Points Relative to Enucleation of the Eyeball and Sympathetic Inflammation	414
To the Histology of Sympathetic Ophthalmitis.....	414
Inflammation of the Exciting Eye Without Sympathetic Ophthalmitis of the Second Eye	414
The Prognosis in Sympathetic Ophthalmia	774
TEETH AND EYES.	
Ocular Disease of Dental Origin	415
Carious Teeth as a Factor in Ocular Disease.....	416
Report of a Case of Reflex Ocular Disturbances Due to Impacted Third Molars	416

TOXICOLOGY.

Are the Use of Naphthalin Against the Lice Pest and Naphthalin Vapors not Indifferent for the Visual Organ?	184
Herpes Zoster Ophthalmicus After Snake Bite.....	416
Ether as an Antidote for Cocain and Novocain Poisoning.....	275
Wood Alcohol Amblyopia—A Case	576

TRACHOMA.

Trachoma in India	185
Is There Immunity From Trachoma?	187
The Nature of Trachoma	416
Treatment of Trachoma	417
The Treatment of Trachoma	417
Experiments With a Specific Treatment for Trachoma.....	417
On the Treatment of Trachoma	576
Successful Treatment of Trachoma and Follicular Conjunctivitis by Intense Bichloride Rub	576

TUMORS.

A Case of Sarcoma of a Socket	188
Metastatic Carcinoma	189
A Case of Tumor of the Iris Without Diagnosis.....	190
A Tumor of the Hypophysis Cerebri	191
A Case of Tuberculosis of the Hypophysis.....	192
Metastatic Endothelial Sarcoma of the Rectus Inferior Muscle	193
On Intraocular Tumor and Radiotherapy.....	193
On Different Forms of Carcinoma of the Lids.....	193
A Case of Sarcoma of the Conjunctiva.....	418
Removal of Epibulbar Epithelioma With Radium Bromide...	418
Diagnosis and Treatment of Bony Tumors of the Orbit.....	418
A Case of Epibulbar Sarcoma	419
Report of a Case of Glioma of the Retina in a Child Eight Months Old	419
Fibro-Adenoma of the Ciliary Body	420
On an Intraocular Spindle Celled Sarcoma Produced by a Filterable Virus	420
Glioma of the Retina With Reports of a Case.....	578
Carcinoma, Apparently Primary, Arising From the Ciliary Processes	578
A Fallacy in the Diagnosis of Glioma Retina	579
A Primary Tumor of the Optic Nerve Successfully Removed With Preservation of the Eyeball, by the Kroenlein Method..	579
On Papilloma of the Conjunctiva	579
To the Knowledge of Glioma of the Retina and Its Spontaneous Involution	580
A Remarkable Case of Carcinoma of the Orbit.....	580
To the Knowledge of Mixed Tumors of the Lacrimal Gland...	581
On Changes of the Eyeball by Pressure of an Orbital Tumor...	582
To the Knowledge of Epithelial Tumors of the Cornea.....	775
On Involution of Glioma of the Retina.....	775
Carcinoma of the Palpebral Conjunctiva and Cornea by Contact	776
A Case of Unusual Width of the Palpebral Aperture as the Result of a Hypophysis Tumor	789
A Case of Fibro-Sarcoma of the Dural Sheath of the Optic Nerve	790

UVEAL TRACT.

Malignant Uveitis Treated With Thyroid Extract.....	582
---	-----

VISION AND COLOR VISION.

Hereditary Deficiency of the Light Sense in Otherwise Healthy Eyes, With Report of a Case	194
On Red-Green Blindness After Glaring by Snow	194
Dark Adaptation of the Eye in Paralysis of the Sympathetic Nerve	194
Heredity of Color Blindness	195
The Clearness of Luminous Perception During Mono- and Binocular Vision	196

Binocular Vision and the Optic Chiasm	420
Conservation of Vision	421
Phototaphophobia	422
Conscious Vision in Development of Amblyopic Eye.....	582
Dark Adaptation	584
The Visual Functions in Intraocular Hemorrhages and in Closure of the Lids.....	584
Luminosity of the Colors.....	777
The Examination of the Colorsense with a Simple Colorfilter..	780
The Behavior and Diagnostic Importance of Dark Adaptation in the Disease of the Optic Nerve. I. Part. The dark adapta- tion in Optic Neuritis and Choked Disc.....	782
War Experiences on Hemeralopia and Background of the Eye..	783
The Behavior and Diagnostic Significance of Dark Adaptation in Atrophy of the Optic Nerve.....	784
VISUAL FIELD.	
Distortions of the Visual Fields in Cases of Brain Tumor: Chiasmal Lesions, with Especial Reference to Bitemporal Hemianopsia	198
Ring Scotoma in Syphilis of the Eye.....	199
On Incongruence and Asymmetry in the Homonymous Hem- ianopic Field	201
The Associated Cerebral Symptoms in Bilateral Cortical Hem- ianopsia	422
Some Unusual Changes in the Visual Fields. The Results of Vascular Lesions in the Brain and Optic Nerves.....	423
Two Cases of Traumatic Double Hemianopsia with Partial Re- covery	424
The Scotoma of Migraine	424
Hemianopic Disturbances of the Visual Fields After Gunshot Injuries of the Skull.....	425
Contributions to the Hemianopic Disturbances of the Visual Field After Gunshot Injuries of the Skull.....	425
Scintillating Scotoma	785
Hemianopsia	786
Visual Disturbances, Especially Bitemporal Hemianopsia, in Tumors of the Hypophysis	786

BOOK REVIEWS

SWANZY.—Handbook of the Diseases of the Eye and Their Treat- ment	202
WÜRDEMANNS.—Lacrimal Diseases and Their Treatment.....	202
JEAN.—Ophthalmoscopic Diagnosis.....	203
WHEELER.—Operations of the Eye and Its Appendages.....	203
JACKSON.—The Ophthalmic Year Book.....	203
WOOD.—The American Encyclopedia of Ophthalmology.....	204
The Medical Annual Synoptical Index.....	204
An Index of Treatment.....	204
PARKER.—Elements of Optics.....	205
INDEX OF PROGNOSIS AND END-RESULTS	206
UNTHOFF.—On the Eye Symptoms in Diseases of the Nervous Sys- tem	207
WILBRAND and SAENGER.—Neurology of the Eye—The Diseases of the Chiasm.....	208
ZUR NEDDEN.—Guide to Expert Testimony on Injuries of the Eye...	208
ROSMANT.—Examination on Color for Railway and Marine Service.	209
HIRSCHBERG.—History of Ophthalmology—The Oculists of Italy from 1800 to 1850	209
History of Ophthalmology. The Oculists of America in the 19th Century	210
PARSONS.—An Introduction to the Study of Color Vision.....	427

Nursing in Diseases of the Eye, Ear, Nose and Throat.....	427
Transactions of the American Ophthalmological Society.....	428
TOROK AND GROUT.—Surgery of the Eye.....	428
FERNANDEZ.—A Visit to New York and Its Eye Clinics.....	429
SHASTID.—The Description of an Ophthalmoscope—an English Translation of von Hemholtz's "Beschreibung eines Augen- spiegels"	586
WOOD.—American Encyclopedia and Dictionary of Ophthalmology..	586
THOMAS, B. A. AND IVY R. H.—Applied Immunology. The Practical Application of Sera and Bacterins Prophylactically, Diagnosti- cally and Therapeutically, with an Appendix on Serum Treat- ment of Hemorrhage, Organotherapy and Chemotherapy.....	587
SIMON.—Infection and Immunity a Textbook of Immunology and Serology for Students and Practitioners.....	588
LEBER.—Diseases of the Retina	588
BERCH.—The Diseases of the Orbit	590
AMERICAN MEDICAL DIRECTORY	797
THORINGTON.—Refraction of the Human Eye and Methods of Esti- mating a Section on the Fitting of Spectacles and Eyeglasses, etc.	797
PETER.—The Principles and Practice of Perimetry.....	798
LEBER.—Diseases of the Retina	799

NOTICE

Fellowship at University of Minnesota	592
---	-----

OBITUARIES

RIVERS, DR. EDMUND.....	432
MILLIKEN, DR. BENJAMIN L.....	591

INDEX TO AUTHORS

Adams, E.	352	Dewey, Christian	417
Allport, Frank	417, 421, 618	Dieffenbach, Wm.	547
Alter, Francis W.	370	Dowling, J. L.	123
Appleman, L. F.	409	Duane, Alexander	549, 553, 763
Armstrong, W. E. M.	713	Dunn, Percy	774
Axenfeld, Th.	117,	Dutrow, Howard V.	416
123, 147, 184, 187, 425, 572,	707		
Ayer, Jas. B.	552	Eaton, F. B.	374
Augstein, C.	742, 783	Ebeling	538
		Edmunds, Walter	709
Bader, Alfred	152	Edridge-Green, F. W.	424
Ball, Thomas	556	Elliot, R. H.	125
Bane, Wm. C.	373	Elschnig, A.	152, 378, 388, 735
Barkan, Otto	763	Ely, C. F.	356
Bayley, W. D.	747	Elwood, Calvin R.	370
Beals, M. B.	174, 576	Emanuel, C.	572
Behr, Carl	399, 754, 782	Emerson, Linn	746
Benjamins, C. E.	140, 758	Engelbrecht, K.	557
Bentley, Frederick	743	Engstadt, G. E.	575
Berg, F.	401	Eusita	790
Best, F.	95	Epataza, Enrique	116
Beth, L.	168	Ewing, A. E.	97
Bielschowsky, A.	556	Eymann, L.	776
Bietti, A.	193		
Birch-Hirschfeld, A.	590	Faber, Jr., L. A.	719
371, 539, 580, 581, 582,	564	Feilchenfeld, W.	742
Birnbaum, H.	660	Fellows, C. G.	524
Blaauw, E. E.	128	Fernandez, Francisco M.	429, 651
Black, Nelson M.	432	Fernandez, J. Santos	707
Black, Melville	520	Fenton, Ralph A.	594
Bluc, Robert	699	Ferree, C. E.	542
Boeke, Prof. J.	569, 697, 699	Fette, Geo. T.	363
Bohm, K.	702, 716, 736	Finlay, C. E.	752
Bordley, James	582	Fischel, A.	524
Boyle, C. C.	100, 531	Fisher, J. Herbert	178, 406, 672
Boynton, W. E.	548	Fisher, W. A.	162
Bradburne, A. A.	175, 358, 531	Foroni, Samillo	372
Brasley, Frank	711	Franko, E.	579
Bredeek, J. F.	413	Freytag, G.	108, 109, 522, 526
Brophy, John A.	420		
Bruecken, A. J.	398	Gamble, Wm. E.	552, 517
Burge, W. E.	354	Gerbandy, Hiskia Rintje	561
Burnham, G. Herbert	532	Gifford, H.	381, 708
Butler, T. Harrison	393	Gilbert	540
	576	Gilbert, W.	535, 753
Calhoun, Phinizy	517	Gleeson, Benjamin	419
Campbell, J. A.	414	Goetz, H. E.	399
Campbell Kenneth	379	Goldsmith, M.	526
Carpenter, E. R.	382	Gradle, Harry S.	103, 563, 652, 742
Cates, Thos. H.	530	Green, John, Jr.	529
Cavara, V.	351, 366	Green, L. D.	353
Chance, Burton	422, 724	Greene, Henry C.	126
Clapp, C. A.	774	Greeves, Affleck	715
Clarke, Ernest	98, 188, 355	Guzman, E.	410
Clay, J. V. F.	655		
Clegg, J. Gray	757	Haag, C.	122
Clement, C. C.	705	Hack, R.	372
Coats, George	547	Hallett, De Wayne	121
Cohen, David Ezechiel	404, 418	Hanke, Victor	400
Colman, W. F.	581	Hansell, Howard F.	369, 419
Collins, E. Treacher	521	Hanssen, R.	712
Cords, Rich.	132	Harbridge, D. F.	726
Corry, M.	416	Hardy, Wm. F.	554
Cosmettatos, G. F.	363	Harc, James H.	153
Crisp, William H.	111, 198	Harford, Charles E.	744
Cross, F. Richardson		Harkness, C. A.	531
Cushing, Harvey		Harris, C. M.	413
		Hatzumi	189
Daniels, C. E.	124, 528	Haupt, W.	173
Dunn, Percy H.	368	Hawkes, Clarence	348
Davie, H. W.	404	Heerfordt, C. F.	368
Davis, A. Edward	104	Hegner, C. A.	379, 380, 729, 738
Deady, Charles	117	Heine, L.	348
de Bruin, J.	167	Helfrich, C. H.	98
de Haas, H. K.	541	Herbert, Lt. Col. Herbert	355
Denman, I. O.	105	Hering, E.	567
Derby, Geo. S.	416	Herrman	417
De Rezende, Cassio S.	371	Hertel, E.	568
Deutschmann, R.	522	Hertz	725
de Wacla, H.			

Hess, C.		McGuire, Hunter H.	127
Heybroek, N. J.	192	McLean, Wm.	171
Hideo 705		Mackie, Thomas J.	749
Higgins, Charles	768	Macula, Lister 748	
Hill, Emory 391		Maddox, Ernest E.	374, 381
Hillegas, Wm. M.	570	Mallwitz, A.	713
Hirschberg, J.	209, 210, 723	Manson, W. Hislop.	749
Hoefnagels, J. P. A.	156	Marlow, M. D.	565
Holloway, T. B.	370, 393	Maruo 787	
Holmes, Gordon 748		Marx 199	
Honig, H. 749		Marzolph, G.	714
Hutchison 204		Masuda 795	
Ibershoff, A. E.	415, 416	Mathewson, Geo. H.	361
Igersheimer, J.	371	May, Charles H.	549
Illig, H. 545		Mayou, M. 498	
Imai 789		Meller, Josef.	183, 365, 414, 775
Inman, W. S. 125		Metzger, J. 570	
Inouye 787		Metzner, R. 179	
Isakowitz 734		Meyerhof, M. 695, 733	
Ishiwara 788		Mika 788	
Ivy, R. H. 587		Milner, C. E. H.	424
Izikawa 790		Mine 787	
Jackson, Edward 104, 771		Mitchell, S. 381, 385	
Jebisawa 795		Moore, R. Foster.	328
Jefferson, Frederick 713		Mori 733	
Jeffrey, Eric 377		Moulton, H. 737	
Jobson, G. B. 375		Munson, Edwin S.	136
Jones, E. L. 179, 407, 708		Muskens, L. J. J.	731
Josefson, A. 786		Myasaki 791	
Kagoshima 791, 793, 795		Myashita 789	
Keiper, Geo. F. 357		Myers, Dean W.	542
Keppeler, E. 542		Nagle, F. O. 718	
Keukenschryver, Nicolaas		Nakamura 787, 793	
Cornells 533		Nakano 790, 794	
Keutel, J. 106		Neeper, E. R. 578	
Key, Ben Witt 356		Neil, A. J. 398	
Kiribuchi, K. 576		Nicolai, C. 189	
Kitasono 790		Noguchi 705	
Kleipool, C. M. 144		Oehlecker 391	
Knapp, Arnold 101, 579		Ohm, Joh. 385, 402, 411	
Koenig, Beirut 107		Okuse 794	
Kohn, K. 543		Oloff, H. 754	
Komoto 789, 790, 793, 794		Onishi 788, 790, 791, 793, 795	
Koster, W. Gzn. 711		Ormond, Arthur W.	725
Koyanagi 787		Otori, Kaizo 182	
Kraupa, T. 366		Pagenstecher, C. H.	162, 733
Kraupa-Runk, Martha 730		Paine, Howard S.	161, 387
Krauss, Frederick 378		Palich-Szanto, Olga 193, 394	
Kress, Geo. H. 133		Parker, George W. 205	
Kruckmann, E. 521		Parker, H. C. 691	
Krusius, M. 571		Parsons, J. Herbert.	127
Kubik, J. 172		Paul, Halle 574	
Kuboki 791		Peck, Grant S. 786	
Kuhnt, H. 145, 146		Peter, Luther C. 373, 375	
Kusama 790, 795		Peters, Richard 739	
Kuynders, H. J. 190		Pfingst, Adolph O.	362
Lamb, Robert Scott.	389	Phillips, W. L. 105	
Lane, Francis 525		Pichler, K. 376	
Langdon, H. M. 194		Piekema 179	
Lauber, H. 392		Plocher, R. 732	
Layson, Z. C. 360		Poffenberger, A. T.	420
Lazarus, P. 134		Pollock, W. B. Inglis.	355
Leber, Th. 588		Posey, W. C. 423, 721	
Lefever, C. W. 747		Prentice, Charles F.	391, 392, 398
Lewis, F. Park. 375, 564, 582		Prince, A. E. 376, 723	
Lewis, Fred D. 746		Purtscher, O. 580	
Lieneman, Jan 777		Rados, Andreas 396, 400	
Lindstedt, Folke 734		Rain, V. L. 139, 377	
Linnell, E. H. 541		Ramsay, A. Maitland.	358
Lloyd, R. I. 105		Rand, G. 394	
Lohmann, W. 194, 766		Rassers, J. R. F. 116	
Lowenstein, A. 172, 549, 729		Raupp, R. 738	
Lowenstein, E. 417		Reber, Wendell 360	
Luedeke, F. 167		Redslob, E. 730	
Luedde, W. H. 135, 773		Reed, R. G. 571	
Lundsgaard, K. 123, 364, 734		Reis 169	
MacLeish, A. C. 359		Reitsch, D. H. 109	
McCaw, John Alexander.	367	Remele, J. 547	
McCool, J. L. 744		Rice, Philip 551	
		Richter, Kiel 756	

Ritchie, F. G.	160	Terry, Robt.	544
Rochat, G. F.	795	Thomas, B. A.	587
136, 137, 139, 140, 147, 758.	780	Thompson, A. Hugh.	555
Roelefs, C. Otto.	196	Thompson, Edgar S.	768, 771
Ronne, H.	120, 181, 201, 394	Thompson, LeRoy.	548
Rosenberg, Carolyn.	713	Tiffany, Flavel B.	499
Rosenow, E. C.	562	Tilma, Pier Jans.	561
Rosmanit, J.	209	Todd, Frank C.	126, 353, 367
Rumsey, C. L.	557	Tresling, J.	130, 727
Russeff, Kosta.	372	Trubin, A.	391
Rutterman, Cornelius.	701	Tsuthibashi.	787
Saenger.	298	Uchida.	788
Saito.	795	Uthoff, W.	107, 108, 207, 131, 425, 550, 715
Sachs, M.	163	Vail, Derrick T.	357, 374, 375, 708
Santos-Fernandez, Juan.	738	Valk, Francis.	153, 385
Sattler, C. H.	558	van Bouwdyk Bastiaanse F. S.	138
Sattler, Robert.	393	van de Graaf, Annie.	720
Schanz, F.	165, 169, 172, 356, 191	van der Hoeve, J.	129, 180, 772
Scheffelaar Kloos.	106	Van Geuns, J. R.	412
Schenderowitsch, P.	106	van Herwerden, M. A.	171
Schlabs, G.	735	van Romunde, L. H.	111
Schmidt, Peter.	158	Velliagen, C.	412
Schoute, G. J.	121, 148, 176, 405	Verhoeff, F. H.	542, 715
Schwarz, Otto.	559	Verwey, A.	115, 750, 766
Seashore, Carl E.	694	Virden, John E.	381
Seefeldter, R.	519, 527	von Helmholtz.	586
Seidel, E.	390	von Hippel, E.	411, 527, 535, 536
Seidlitz, G. N.	521	von Rohr, M.	392
Sennichi.	794	Vogt, A.	143, 765
Seto.	791	von Skramlik, E.	142
Shahan, Wm. E.	135	von Szily, A.	316
Shanklin, E. M.	185	Waardenburg, P. J.	106, 195, 704, 760
Shastid, Thomas Hall.	586	Wada.	793
Shepard, Geo. A.	767	Walker, Clifford B.	198
Shigeta.	790	Walker, Cyril H.	498
Shiroishi.	793	Wassenaar, Th.	567
Shoemaker, William T.	358	Watanabe.	790
Shumway, Edward A.	362	Watts, Harry A.	523
Sidlor-Huguenin.	386	Weidler, Walter Baer.	374, 381
Siegfried, C.	582	Welton, Carrol B.	365
Siegrist, A.	106	Wessely, K.	99, 546, 584
Simon, Charles E.	588	Weve, H.	758
Small, Charles P.	360, 370	Wheeler, John M.	203
Smith, David Priestley.	159	Wiener, Meyer.	544
Small, Henry.	353, 354, 532	Wilbrand.	208
Smith, John J.	523	Williams, Anna W.	713
Smith, Priestley.	133	Williams, Carl.	393
Smith, Wm. H.	511	Williams, E. R.	567
Snead, C. M.	352	Wilson, James Alexander.	553
Snellen, H.	95	Wipper, Otto.	493, 549
Snyder, Walter.	352	Wokenius, H.	415
Sontag.	716	Wolfe, C. T.	418
Speleers, Reimond.	163	Wolff, L. K.	146, 151
Spicer, Holmes.	715	Wolffberg.	558
Spiro.	132	Wolfflin, E.	170
Stähli, J.	376, 395, 420	Wood, Casey A.	204, 365, 373
Stargaardt.	194	Woodruff, F. E.	539
Stargardt.	389	Woodruff, H. W.	722
Starr, Elmer G.	513	Woods, Hiram.	360
Steiner, L.	775	Wray, Charles.	418
Steinohrt, J. A.	147	Wright, Hal R.	389, 395
Stengele, Udo.	579	Wüdemann, H. V.	202, 427, 428
Stephenson, Sydney.	369, 578	Wyler, Jesse S.	741
Sternberg, Jos. E.	578	Wynn, J. J.	520
Sternen, Edward.	358	Yale, A. W.	548
Stimel.	539	Zade, M.	154, 520, 396, 574
Stock, W.	697	Zeeman, W. P. C.	151, 196, 785, 772
Straub, M.	112, 161	Zimmermann, C.	587, 588, 590, 799
Streiff, J.	161, 405	Zoth, O.	375
Stumpf.	376	ZurNedden, M.	208
Suganuma.	789	Zydek, F.	99
Szwany.	202		
Swift, George W.	586, 587, 785, 797, 798		
Tamura.	793		
Taylor, G. H.	688		
Taylor, James.	717		
Tarle, Jacob.	118		
Ten Doesschate, G.	703		

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